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CATALOGUE

OF THE

FISHES

IN THE

BRITISH MUSEUM.

BY

ALBERT GÜNTHER, M.A., M.D., Ph.D., F.Z.S.,

ETC. ETC.

VOLUME THIRD.

LONDON:
PRINTED BY ORDER OF THE TRUSTEES.
1861.

CATALOGUE

OF THE

ACANTHOPTERYGIAN FISHES

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BY

DR. ALBERT GÜNTHER.

VOLUME THIRD.

GOBIIDÆ,
DISCOBOLI,
OXUDERCIDÆ,
BATRACHIDÆ,
PEDICULATI,
BLENNIIDÆ,
ACANTHOCLINIDÆ,
COMEPHORIDÆ,
TRACHYPTERIDÆ,
LOPHOTIDÆ,
TEUTHIDIDÆ,
ACRONURIDÆ,
HOPLOGNATHIDÆ,
MALACANTHIDÆ,
NANDIDÆ,
POLYCENTRIDÆ,
LABYRINTHICI,
LUCIOCEPHALIDÆ,
ATHERINIDÆ,
MUGILIDÆ,
OPHIOCEPHALIDÆ,
TRICHONOTIDÆ,
CEPOLIDÆ,
GOBIESOCIDÆ,
PSYCHROLUTIDÆ,
CENTRISCIDÆ,
FISTULARIDÆ,
MASTACEMBELIDÆ,
NOTACANTHI.

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62.

PREFACE.

Dr. Günther observes,—" This volume concludes the Order of Acanthopterygii as defined by Johannes Müller. Weighty reasons have been brought forward against the natural limits of this Order, when compared with the other coordinate divisions of the Teleostei; and it would almost appear as if Müller, in his attempt to base the systematic distribution of that subclass on isolated anatomical characters, had not been successful in creating one Order which would comprise fishes allied in habit, in mode of life, and in the rest of their principal anatomical characters. But, frequent as are the objections against Müller's modifications of Cuvier's system, no one has proposed any arrangement which would give a more satisfactory result, if put to the test of carrying it out to a detailed subdivision. Systematic attempts not accompanied with, or confirmed by, proper characters are unavailable to others, and may even delude the author himself*.

" Under these circumstances, I still feel satisfied to distribute the fishes, on the base of Müller's *ordinal* arrangement, into natural minor divisions, whether called families, groups, or genera; and, in my opinion, there is no character equal in importance to that of the structure and position of the fins; for, as they are in immediate connexion with the entire habit of the fishes and with their mode of life, they best indicate their natural affinities, and, indeed, prove to be the most constant and general characters. Isolated, striking exceptions will occur, but they are comparatively few in number. The examination of the skeletons has led to the conclusion that the number of the vertebræ is another character of great importance for the distinction of the families; but whether it has any bearing of

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* For instance, I think it quite impossible for my highly esteemed friend, Dr. v. Bleeker, to find one or several characters common to all the fishes of his "Caterva 3. Blennii," without being obliged to take into the same division fishes that are widely sundered from them according to his system.

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still greater import cannot be exactly determined at present, my investigations on this point, although extending over the Osteological Collection in the British Museum, which is making rapid progress towards completeness, as well as over several other Collections, being far from concluded.

"The plan adopted in the preceding volumes has been maintained, except that, to save space, the specimens from the same locality are, in their enumeration, collected into one line. It has thus been possible to give full descriptions of the new species, the number of which amounts to more than twice that contained in the previous volume. If we compare the result with the corresponding parts of the 'Histoire Nat. des Poissons,' we find:—

Total number of species in Cuv. & Val.	600
Total number of species in this volume	1168
Species apparently well characterized in Cuv. & Val.	463
Species apparently well characterized in this volume	935

"Moreover, full descriptions have been given of the species of those families which had not been previously worked out.

"The Collection of the British Museum has received important additions since the publication of the last volume; and I feel the more pleasure in referring to them, as several have been given or made to add to the completeness of this work:—

"1. A Collection of Fishes from the Baltic, presented by Max, Prince of Neuwied.

"2. A Collection of Fishes from the Sea of Madeira, presented by J. Y. Johnson, Esq.

"3. A Collection of Fishes from the Mediterranean and Red Sea, presented by Dr. E. Rüppell.

"4. A Collection of Fishes from the Coast of Mossambique, and of Labroid Fishes, presented by Prof. Peters of the Berlin Museum.

"5. Two Collections of Fishes from the Mediterranean and from the Lower Nile, made by J. Petherick, Esq., H.M. Consul at Chartum.

"6. A Collection of Fishes from Bengal, believed to contain many typical specimens of Buchanan Hamilton's work, presented by G. R. Waterhouse, Esq.

"7. A Collection of Marine Fishes from Java, purchased of Mr. Jamrach.

"8. A Collection of Freshwater Fishes from Siam, made by M. Mouhot.

"9. A Collection of Fishes from the West Coast of Central America, made by Capt. Dow, and presented by Dr. P. L. Sclater, Secr. Zool. Soc.

"10. A Collection of Freshwater Fishes from Bahia, made by Dr. O. Wucherer.

"11. A Collection of the Duplicates of Fishes in the Museum at Fort Pitt, presented by the Medical Officers of that establishment.

"The present volume contains several genera of Fishes so extremely rich in species, that we must not expect to find the greater portion of them united in one collection. However, in order to give as many original descriptions as possible, and to determine with accuracy the specimens in the British Museum, several of the Continental Museums have been personally examined. Prof. Schlegel of Leyden, Dr. E. Rüppell of Frankfort, Prince Max of Neuwied, Prof. Peters of Berlin, Prof. Troschel of Bonn, Dr. v. Bleeker of Batavia, Prof. Aitken at Fort Pitt, Prof. Gill of Washington, &c., &c., have either given me much valuable information, or most liberally assisted me during my visits to their collections."

JOHN EDWARD GRAY.

British Museum,
July 15, 1861.

ADDITIONS

TO THE

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SYSTEMATIC INDEX.

Fam. 19. Gobiidæ.

First Group. Gobiina.

Page
1. Gobius, *Artedi* 3
1. cyprinoides, *Pall.* 8
2. marmoratus, *Pall.* ..546, 550
4. semilunaris, *Heck.* 10
6. sulcatus, *Eichw.* 10
7. niger, *L.* 11
8. auratus, *Risso* 11
9. lesueurii, *Risso* 12
10. jozo, *L.* 12
quadricapillus, *Pall.* .. 4, 546
macropterus, *Nordm.* 4
11. flavus, *C. et V.* 13
12. nudiceps, *C. et V.* 13
13. genivittatus, *C. et V.* 13
14. oligolepis, *Bleek.* 14
15. buccatus, *C. et V.* 14
16. cyclopterus, *C. et V.* 14
17. lineatus, *Jenyns* 15
18. oplopomus, *C. et V.* 15
19. martensii, *Gthr.* 15
20. quagga, *Heck.* 16
21. panizzæ, *Verga* 16
22. rhodopterus, *Gthr.* 16
22*a*. leopardinus, *Nordm.* .. 547
23. ophthalmoporus, *Bleek.* .. 17
24. obscurus, *Peters* 17
25. elegans, *K. et v. H.* 18
olivaceus, *Schleg.* 4
richardsonii, *Bleek.* 4
kuhlii, *Bleek.* 4
tylankahanensis, *Bleek.* .. 4
pœcilosoma, *Bleek.* 4
26. baliurus, *C. et V.* 18
27. atherinoides, *Peters* 18
28. puntangoides, *Bleek.* 19
(puntang, *Bleek.* .... 19)
29. ehrenbergii, *C. et V.* 19
30. hemigymnopomus, *Bleek.* 20
Page
31. biocellatus, *C. et V.* 20
32. lentiginosus, *Richards.* .. 20
33. ornatus, *Rüpp.* 21
34. giuris, *B. H.* 21
35. viridi-punctatus, *C. et V.* . 24
eleotrioides, *Bleek.* 4
35*a*. macrostoma, *Steind.* .. 548
36. sublitus, *Cant.* 24
37. albo-punctatus, *C. et V.* .. 25
38. nebulo-punctatus, *C. et V.* 26
38*a*. coalitus, *Benn.* 548
39. soporator, *C. et V.* 26, 549
(bishopi, *M. et T.* ...... 27)
39*a*. knerii, *Steind.* 549
40. *nigri, *Gthr.* 27
41. nox, *Bleek.* 28
42. filosus, *C. et V.* 28
43. apogonius, *Cant.* 28
44. sadanundio, *B. H.* 29
45. criniger, *C. et V.* 29
46. cocosensis, *Bleek.* 30
47. polycynodon, *Bleek.* 30
48. reichii, *Bleek.* 30
49. sumatranus, *Bleek.* 31
50. phaiospilosoma, *Bleek.* .. 31
51. semidoliatus, *C. et V.* .. 31
52. pasuruensis, *Bleek.* 32
53. hoevenii, *Bleek.* 32
54. tambujon, *Bleek.* 32
55. javanicus, *Bleek.* 33
56. borneensis, *Bleek.* 33
57. melanurus, *Bleek.* 33
58. oxypterus, *Bleek.* 34
59. fasciatus, *Gill* 34
60. echinocephalus, *Rüpp.* .. 34
61. amiciensis, *C. et V.* 35
62. bitelatus, *C. et V.* 35
63. notacanthus, *Bleek.* .. 35, 549
64. caninoides, *Bleek.* 36
65. capistratus, *Peters* 36
66. ophthalmotænia, *Bleek.* .. 37

	Page
67. chinensis, _Osbeck_	37
68. caninus, _C. et V._	38
69. venenatus, _C. et V._	38
70. cyanomos, _Bleek._	39
71. chlorostigmatoides, _Bleek._	39
72. *frenatus, _Gthr._	39
quadriporus, _C. et V._	4
brevifilis, _C. et V._	4
janthinopterus, _Bleek._	4
goldmanni, _Bleek._	5
chlorostigma, _Bleek._	5
modestus, _Bleek._	5
ripilepis, _Richards._	5
pflaumii, _Bleek._	5
similis, _Gill_	5
73. cyanoclavis, _Cant._	40
74. *brevirostris, _Gthr._	41
75. cauerensis, _Bleek._	41
76. bontii, _Bleek._	41
77. phaiomelas, _Bleek._	42
78. xanthosoma, _Bleek._	42
(melanosoma, _Bleek._	42)
79. baliuroides, _Bleek._	42
80. gymnauchen, _Bleek._	43
80_a._ *paradoxus, _Gthr._	549
81. pleurostigma, _Bleek._	43
82. gastrospilus, _Bleek._	43
83. *microphthalmus, _Gthr._	44, 550
84. acutipinnis, _C. et V._	44
melanostigma, _Bleek._	5
85. *spectabilis, _Gthr._	45
86. signatus, _Pet._	45
87. *schlegelii, _Gthr._	46
87_a._ lyricus, _Girard_	550
88. polynema, _Bleek._	46
89. margariturus, _Richards._	47
90. temminckii, _Bleek._	47
91. mystacinus, _C. et V._	48
92. tentacularis, _C. et V._	48
93. ophthalmonema, _Bleek._	48
94. microlepis, _Bleek._	49
95. papuensis, _C. et V._	49
96. belosso, _Bleek._	50
97. lanceolatus, _Bl._	50
smaragdus, _C. et V._	5
hastatus, _Girard_	6, 546
brasiliensis, _Bl._	6
98. ratan, _Nordm._	551
98_a._ syrman, _Nordm._	551
99. batrachocephalus, _Pall._	51, 551
100. stevenii, _Nordm._	52
100_a._ fluviatilis, _Pall._	551
101. gymnotrachelus, _Kessl._	552
102. platyrostris, _Pall._	553
102_a._ kessleri, _Gthr._	553
102_b._ trautvetteri, _Kessl._	553
103. paganellus, _L._	52, 553
104. melanostoma, _Pall._	53, 554
105. ophiocephalus, _Pall._	54, 554
106. cruentatus, _Gm._	54
107. geniporus, _C. et V._	55
108. capito, _C. et V._	55, 554
109. maderensis, _C. et V._	57
guttatus, _C. et V._	3
limbatus, _C. et V._	3
lugens, _Nordm._	4
caspius, _Eichw._	4
affinis, _Eichw._	4
ephippiatus, _Lowe_	4
fluviatilis, _Pall._	4
cephalarges, _Pall._	4, 546
constructor, _Nordm._	4
virescens, _Pall._	4
chilo, _Pall._	4
fuliginosus, _M‘Coy_	4
110. *ekströmii, _Gthr._	57
111. minutus, _Gm._	58, 554
(gracilis, _Jenyns_	59)
112. colonianus, _Risso_	59
113. banana, _C. et V._	59, 554
114. æneo-fuscus, _Peters_	61
115. *mexicanus, _Gthr._	61
116. *transandeanus, _Gthr._	62
117. *crassilabris, _Gthr._	63
118. ocellaris, _Brouss._	64
nigripinnis, _C. et V._	5
pallidus, _C. et V._	5
guamensis, _C. et V._	5
chiloensis, _Guich._	5
stamineus, _Val._	5
blokzeyli, _Bleek._	5
cæruleus, _Liénard_	5
119. grammepomus, _Bleek._	64, 554
120. gymnopomus, _Bleek._	65
121. brunneus, _Schleg._	65
platycephalus, _Richards._	5
122. annularis, _Gill_	65
123. xanthozona, _Bleek._	66
124. *platynotus, _Gthr._	66
125. sphinx, _C. et V._	67
126. phalæna, _C. et V._	67
127. semicinctus, _Benn._	68
papilio, _C. et V._	5
sinensis, _Lacép._	5
128. albomaculatus, _Rüpp._	69
129. decussatus, _Bleek._	69
130. bynoensis, _Richards._	70
131. cæruleopunctatus, _Rüpp._	70
132. cyanotænia, _Bleek._	71
133. niveatus, _C. et V._	71
134. cryptocentrus, _C. et V._	71
135. russus, _Cant._	72

Page
136. voigtii, *Bleek.* 72
137. polyophthalmus, *Bleek.* 73
138. knutteli, *Bleek.* 73
139. arabicus, *Gm.* 74
mertensii, *C. et V.* 5
pavoninoides, *Bleek.* 5
140. fontanesii, *Bleek.* 74
141. gymnocephalus, *Bleek.* 75
141 *a.* *seminudus, *Gthr.* 554
142. petrophilus, *Bleek.* 75
143. ruthensparri, *Euphras.* 76
144. stigmothonus, *Rich.* 76
145. flavimanus, *Schleg.* 76
146. newberrii, *Girard* 77
147. hexanema, *Bleek.* 77
148. ommaturus, *Rich.* 77
149. lepidus, *Girard* 78
150. hasta, *Schleg.* 78
151. stigmatias, *Richards.* 78
152. virgo, *Schleg.* 79
rubro-tæniatus, *Lién.* 6
commersonii, *C. et V.* 6
cæruleus, *Lacép.* 6
würdemanni, *Girard* 6, 546
catulus, *Girard* 6, 546
gulosus, *Girard* 6, 546
anjerensis, *Bleek.* 6
cobitis, *Pall.* 6
gutum, *Buch. Ham.* 6
melanopus, *Bleek.* 6
patella, *Thunb.* 6
breviceps, *Blyth* 6
2. Euctenogobius, *Gill* 79
1. badius, *Gill.* 79
2. *sagittula, *Gthr.* 555
3. *Latrunculus, *Gthr.* 80
1. albus, *Parn.* 80, 556
2. pellucidus, *Nardo* 556
4. Apocryptes, *C. et V.* 80
1. lanceolatus, *Schn.* 80
2. dentatus, *C. et V.* 81
3. borneensis, *Bleek.* 81
4. bato, *Buch. Ham.* 82
5. serperaster, *Rich.* 82
6. rictuosus, *C. et V.* 82
7. macrolepis, *Bleek.* 83
8. nexipinnis, *Cant.* 83
9. henlei, *Bleek.* 83
10. madurensis, *Bleek.* 84
11. glyphidodon, *Bleek.* 84
12. brachypterus, *Bleek.* 84
5. Evorthodus, *Gill* 84
1. breviceps, *Gill.* 85
6. Gobiosoma, *Girard* 85
1. alepidotum, *Schn.* 85
1 *a.* molestum, *Girard* 556

Page
2. diadematum, *Rüpp.* 85
3. macrognathos, *Bleek.* 86
4. ophicephalum, *Jen.* 86
5. nilssonii, *Düb. et Kor.* 86
6. stuvitzii, *Düb. et Kor.* 86
7. Gobiodon, *K. et v. H.* 87
1. citrinus, *Rüpp.* 87
2. rivulatus, *Rüpp.* 87
3. quinque-strigatus, *C. et V.* 87
4. ceramensis, *Bleek.* 88
5. histrio, *K. et v. H.* 88
6. heterospilos, *Bleek.* 88
7. *micropus, *Gthr.* 89
coryphænula, *C. et V.* 87
erythrophaios, *Bleek.* 87
8. Triænophorichthys, *Gill* 89
1. trigonocephalus, *Gill* 89
2. *barbatus, *Gthr.* 90
8 *a.* Tridentiger, *Gill* 566
1. obscurus, *Schleg.* 566
9. Benthophilus, *Eichw.* 91
1. macrocephalus, *Pall.* 91, 556
10. Sicydium, *C. et V.* 91
1. plumieri, *Bl.* 92
2. lagocephalum, *Kölr.* 92
3. laticeps, *C. et V.* 93
4. stimpsoni, *Gill* 93
5. xanthurum, *Bleek.* 93
6. micrurum, *Bleek.* 93
7. macrostetholepis, *Bleek.* 94
8. parvei, *Bleek.* 94
9. cynocephalum, *C. et V.* 94
10. microcephalum, *Bleek.* 95
11. gymnauchen, *Bleek.* 95
12. zosterophorum, *Bleek.* 95
13. balinense, *Bleek.* 96
11. Lentipes, *Gthr.* 96
1. concolor, *Gill* 96
12. Periophthalmus, *Schn.* 96
1. koelreuteri, *Schn.* 97, 557
2. chrysospilos, *Bleek.* 100
3. schlosseri, *Pall.* 100
fuscatus, *Blyth* 96
13. Boleophthalmus, *C. et V.* 101
1. boddaertii, *Pall.* 102
2. pectinirostris, *Gm.* 102
3. dussumieri, *C. et V.* 104
4. *sculptus, *Gthr.* 104
5. viridis, *Buch. Ham.* 104
dentatus, *C. et V.* 101
campylostomus, *Rich.* 101
laokus, *C. et V.* 101
14. Eleotris, *Gronov.* 105
1. ophiocephalus, *K. et v. H.* 107
2. cantoris, *Gthr.* 108
3. porocephaloides, *Bleek.* 109

Page
4. aporos, *Bleek.* 109
5. hoedtii, *Bleek.* 110
(tolsoni, *Bleek.* .... 110)
6. macrolepidota, *Bl.* 111
7. madagascariensis, *C. et V.* 111
8. mogurnda, *Richards.* 111
9. maculata, *Bl.* 112
9*a.* somnolenta, *Girard.* ... 557
10. grandisquama, *C. et V.* .. 113
11. sima, *C. et V.* 113
12. gobioides, *C. et V.* 114
13. obscura, *Schleg.* 115
13*a.* *potamophila, *Gthr.* .. 557
14. oxycephala, *Schleg.* 115
15. hasseltii, *Bleek.* 116
16. butis, *Buch. Ham.* ..116, 558
17. amboinensis, *Bleek.* 117
18. melanostigma, *Bleek.* 117
19. caperata, *Cant.* 117
20. cyprinoides, *C. et V.* 118
21. leuciscus, *Bleek.* 118
22. tænionotopterus, *Bleek.* .. 118
23. cyanostigma, *Bleek.* 119
24. dormitatrix, *Schn.* ..119, 558
25. lembus, *Gthr.* 121
26. lateralis, *Gill* 122
27. gyrinus, *C. et V.* 122, 558
28. smaragdus, *C. et V.* 123
29. fornasini, *Bianc.* 123
30. gyrinoides, *Bleek.* 123
31. marmorata, *Bleek.* 123
32. guavina, *C. et V.* 124
33. canina, *Bleek.* 124
34. periophthalmus, *Bleek.* .. 124
35. fusca, *Schn.* 125, 558
(pseudacanthopomus, *Bleek.* 126)
36. melanosoma, *Bleek.* 126
37. belobrancha, *C. et V.* 127
38. tænioptera, *Bleek.* 127
39. sinensis, *Lacép.* 127
40. urophthalmus, *Bleek.* 128
41. urophthalmoides, *Bleek.* . 128
42. *siamensis, *Gthr.* 129
43. macrodon, *Bleek.* 129
44. muralis, *Q. et G.* 130
45. sexguttata, *C. et V.* 130
46. strigata, *C. et V.* 131
47. helsdingenii, *Bleek.* 131
48. heteroptera, *Bleek.* 132
49. microlepis, *Bleek.* 132
acanthopomus, *Bleek.* .. 105
radiata, *Q. et G.* 105
wolffii, *Bleek.* 105
melanurus, *Bleek.* 105
viridis, *Bleek.* 105
prismatica, *Bleek.* 105
gymnopomus, *Bleek.* 105
flammans, *Cant.* 105
trabeatus, *Richards.* 105
longipinnis, *Benn.* 105
danius, *B. H.* 105
15. Asterropteryx, *Rüpp.* 132
1. semipunctatus, *Rüpp.* .. 132

Second Group. AMBLYOPINA.

16. Amblyopus, *C. et V.* 133
1. cæculus, *Schn.* 133
2. gracilis, *C. et V.* 134
3. *brachygaster, *Gthr.* 134
4. hermannianus, *Lacép.* .. 135
5. *tænia, *Gthr.* 135
6. urolepis, *Bleek.* 136
7. brachysoma, *Bleek.* 136
8. broussonetii, *Lacép.* 136
roseus, *C. et V.* 133
eruptionis, *Bleek.* 133
lacepedii, *Schleg.* 133
rugosus, *Rich.* 133

Third Group. TRYPAUCHENINA.

17. Trypauchen, *C. et V.* 137
1. vagina, *Schn.* 137
2. microcephalus, *Bleek.* .. 137
18. Trypauchenichthys, *Bleek.* 137
1. typus, *Bleek.* 138

Fourth Group. CALLIONYMINA.

19. Platyptera, *K. et v. H.* .. 138
1. aspro, *K. et v. H.* 138
20. Callionymus, *L.* 138
1. lyra, *L.* 139
2. maculatus, *Rafin.* 144
3. festivus, *Pall.* 144
4. belenus, *Risso* 145
5. curvicornis, *C. et V.* 145, 558
6. huguenii, *Bleek.* 145
7. lunatus, *Schleg.* 146
8. hindsii, *Richards.* 146
9. sagitta, *Pall.* 146
10. phaëton, *Gthr.* 147
11. altivelis, *Schleg.* 147
12. calauropomus, *Richards.* . 147
13. filamentosus, *C. et V.* .. 147
14. schaapii, *Bleek.* 148
15. longecaudatus, *Schleg.* 148, 558
16. simplicicornis, *C. et V.* .. 149
17. goramensis, *Bleek.* 149
18. lineolatus, *C. et V.* 149
19. ocellatus, *Pall.* 150
20. marmoratus, *Pet.* 150
21. opercularis, *C. et V.* 151
22. opercularioides, *Bleek.* .. 151

Page
reticulatus, *C. et V.* 138
fasciatus, *C. et V.* 138
orientalis, *Schneid.* 139
melanotopterus, *Bleek.* .. 139
21. Vulsus, *Gthr.* 151
1. dactylopus, *Benn.* 152

Appendix.

Luciogobius, *Gill* 152
1. guttatus, *Gill* 152
Oxymetopon, *Bleek.* 153
1. typus, *Bleek.* 153

Fam. 20. DISCOBOLI.

First Group. CYCLOPTERINA.

1. Cyclopterus, *Artedi* 154
1. lumpus, *L.* 155
2. spinosus, *Müll.* 157
3. *orbis, *Gthr.* 158

Second Group. LIPARIDINA.

2. Liparis, *Artedi* 158
1. vulgaris, *Flem.* 159
2. fabricii, *Kröy.* 161
3. montagui, *Donov.* 161
4. callyodon, *Pall.* 162
5. *cyclopus, *Gthr.* 163
6. gelatinosus, *Pall.* 163
7. pulchellus, *Ayres* ..164, 559
8. mucosus, *Ayres* 165, 559

Fam. 21. OXUDERCIDÆ.

1. Oxuderces, *Valenc.* 165
1. dentatus, *Valenc.* 165

Fam. 22. BATRACHIDÆ.

1. Batrachus, *Schn.* 166
1. tau, *L.* 167
1 *a.* apiatus, *C. et V.* 559
2. grunniens, *Bl.* 168
3. *trispinosus, *Gthr.* 169
4. dussumieri, *C. et V.* 169
5. dubius, *White* 169
6. diemensis, *Lesueur* 170
7. didactylus, *Schn.* 170
8. *pacifici, *Gthr.* 173
9. surinamensis, *Schn.* 174
gronovii, *C. et V.* 166
variegatus, *C. et V.* 166
cryptocentrus, *C. et V.* .. 166
2. *Thalassophryne, *Gthr.* .. 174
1. *maculosa, *Gthr.* 175

Page
3. Porichthys, *Girard* 175
1. porosissimus, *C. et V.* .. 176
2. porosus, *C. et V.* 177

Fam. 23. PEDICULATI.

1. Lophius, *Artedi* 178
1. piscatorius, *L.* 179
2. setigerus, *Wahl.* 180
3. budegassa, *Spinola* 180
americanus, *C. et V.* 181
vomerinus, *C. et V.* 181
upsicephalus, *Smith* 181
2. Brachionichthys, *Bleek.* 182, 560
1. hirsutus, *Lacép.* 182, 560
2. lævis, *Lacép.* 182
(politus, *Richards.* ...... 183)
sebæ, *Gthr.* 182
3. *Saccarius, *Gthr.* 183
1. *lineatus, *Gthr.* 183
4. Antennarius, *Commers.* .. 183
1. marmoratus, *Gthr.* 185
α. pictus, *Schn.* 186
β. var. 186
γ. raninus, *Tiles.* 187
δ. gibbus, *Mitch.* 187
ε. marmoratus, *Schn.* ... 187
ζ. var. 188
2. barbatulus, *Eyd. et Soul.* . 188
3. histrio, *L.* 188
4. tigris, *Poey* 189
5. hispidus, *Schn.* 189
6. pinniceps, *Commers.* 190
(lacepedii, *Bleek.* ...... 190)
7. tridens, *Schleg.* 191
8. moluccensis, *Bleek.* 191
9. coccineus, *Less.* 191
10. lindgreeni, *Bleek.* 192
11. urophthalmus, *Bleek.* .. 192
12. commersonii, *Lacép.* 192
13. principis, *C. et V.* 193
14. horridus, *Bleek.* 193
15. melas, *Bleek.* 194
16. multiocellatus, *Gthr.* 194
α. multiocellatus, *C. et V.* 194
β. var. 194
γ. leucosoma, *Bleek.* 195
δ. leprosa, *Eyd. et Soul.* . 195
17. nummifer, *Cuv.* 195
18. notophthalmus, *Bleek.* .. 196
19. ocellatus, *C. et V.* 196
20. biocellatus, *Cuv.* 196
21. tenebrosus, *Poey* 197
22. caudimaculatus, *Rüpp.* .. 197
23. chironectes, *Lacép.* 197
24. pardalis, *C. et V.* 198

Page
25. polyophthalmus, *Bleek.* 198
26. phymatodes, *Bleek.* 198
(oligospilos, *Bleek.* 198)
27. leprosus, *Bleek.* 198
28. bigibbus, *Lacép.* 199, 560
29. bougainvillii, *C. et V.* 199
pavoninus, *C. et V.* 183
chlorostigma, *Ehrenb.* 183
trisignatus, *Richards.* 184
mentzelii, *C. et V.* 184
furcipilis, *Cuv.* 184
marmoratus, *Shaw* 184
bicornis, *Lowe* 184
dorehensis, *Bleek.* 184
5. Chaunax, *Lowe* 200
1. pictus, *Lowe* 200
6. Malthe, *Cuv.* 200
1. vespertilio, *L.* 201
2. cubifrons, *Richards.* 203
7. Halieutæa, *C. et V.* 203
1. stellata, *Wahl.* 203, 560
8. Ceratias, *Kröy.* 205
1. holbölli, *Kröy.* 205

Fam. 24. Blenniidæ.

1. Anarrhichas, *Artedi* 208
1. lupus, *L.* 208
2. denticulatus, *Kröyer* 211
2. Anarrhichthys, *Ayres* 211
1. felis, *Girard* 211
3. Blennius, *Artedi* 211
1. gattorugine, *Bl.* 212
2. cornutus, *L.* 213
3. tasmanianus, *Rich.* 214
4. semifasciatus, *Rüpp.* 214
5. cornifer, *Rüpp.* 214
6. capito, *C. et V.* 215
7. erythrocephalus, *Risso* 215
8. tentacularis, *Brünn.* 215, 560
9. filicornis, *C. et V.* 216
9*a.* melanio, *Kessl.* 561
10. smyrnensis, *C. et V.* 216
11. rouxi, *Cocco* 217
12. fucorum, *C. et V.* 217
13. gentilis, *Girard* 217
14. vulgaris, *Pollini* 217, 561
(cagnota, *Val.* 218)
15. sanguinolentus, *Pall.* 218, 561
16. *sinensis, *Gthr.* 219
17. pantherinus, *C. et V.* 219
18 sordidus, *Benn.* 220
19. varus, *Risso* 220
20. basiliscus, *C. et V.* 220
21. graphicus, *Risso* 221
22. sphinx, *C. et V.* 221
Page
23. pavo, *Risso* 221, 561
24. ocellaris, *L.* 222
25. galerita, *L.* 222, 561
26. cristatus, *L.* 223
27. crinitus, *C. et V.* 224, 561
28. *emarginatus, *Gthr.* 224
29. *macropteryx, *Rüpp.* 224
30. *bifilum, *Gthr.* 225, 561
31. lupulus, *Bonap.* 225
32. fissicornis, *C. et V.* 225
32 *a.* multifilis, *Girard* 562
33. *æquipinnis, *Gthr.* 225
34. *brevipinnis, *Gthr.* 226
35. pholis, *L.* 226
36. trigloides, *C. et V.* 227
36*a.* bufo, *Lowe* 562
37. geminatus, *Wood* 228
38. punctatus, *Wood* 228
ruber, *C. et V.* 211
inæqualis, *C. et V.* 211
frater, *Asso* 212
goreensis, *C. et V.* 212
oceanicus, *C. et V.* 212
carolinus, *C. et V.* 212
parvidens, *C. et V.* 212
tentacularis, *Risso* 212
cornu cervi, *Risso* 212
stellatus, *Risso* 212
galerita, *Risso* 212
lineatus, *Guich.* 212
hentzii, *Lesueur* 212
aurosplendidus, *Rich.* 212
fasciolatoceps, *Rich.* 212
4. Chasmodes, *C. et V.* 228
1. boscianus, *Lacép.* 229
2. quadrifasciatus, *Wood* 229
3. novemlineatus, *Wood* 229
5. Petroscirtes, *Rüpp.* 229
1. tapeinosoma, *Bleek.* 230
2. rhinorhynchus, *Bleek.* 230
3. amblyrhynchus, *Bleek.* 230
4. tæniatus, *Q. et G.* 231
5. filamentosus, *C. et V.* 231
6. punctatus, *C. et V.* 231
7. *dispar, *Gthr.* 232
8. kallosoma, *Bleek.* 233
9. elongatus, *Peters* 233
10. variabilis, *Cant.* 234
11. breviceps, *C. et V.* 234
12. ancylodon, *Rüpp.* 235
13. polyodon, *Bleek.* 235
14. cyprinoides, *C. et V.* 235
15. solorensis, *Bleek.* 235
16. anema, *Bleek.* 236
17. grammistes, *C. et V.* 236
18. temminckii, *Bleek.* 236

Page
19. bankanensis, *Bleek.* 237
20. heyligeri, *Bleek.* 237
21. mitratus, *Rüpp.* 237
22. barbatus, *Peters* 238
23. thepassii, *Bleek.* 238
24. anolis, *C. et V.* 238
25. biocellatus, *C. et V.* 239
26. fasciatus, *Jenyns* 239
(ornatus, *Jenyns* ...... 239)
dussumieri, *C. et V.* 229
fasciolatus, *Ehrenb.* 229
bankieri, *Richards.* 229
6. Salarias, *Cuv.* 239
1. flavo-umbrinus, *Rüpp.* .. 241
2. oryx, *Ehrenb.* 241
3. *sexfilum, *Gthr.* 241
4. tridactylus, *Schneid.* 242
(tetradactylus, *Bleek.* .. 242)
5. atlanticus, *C. et V.* 242
6. *nitidus, *Gthr.* 243
7. amboinensis, *Bleek.* 244
8. rivulatus, *Rüpp.* 244
9. fasciatus, *Bl.* 244
10. fuscus, *Rüpp.* 245
11. nigro-vittatus, *Rüpp.* .. 245
12. cyclops, *Rüpp.* 246
13. ceramensis, *Bleek.* 246
14. frenatus, *C. et V.* 246
15. sebæ, *C. et V.* 246
16. castaneus, *C. et V.* 247
17. variolosus, *C. et V.* 247
18. viridis, *C. et V.* 247
19. cuvieri, *Gthr.* 248
20. textilis, *Q. et G.* 248
21. marmoratus, *Benn.* ..248, 562
22. arenatus, *Bleek.* 249
23. vermiculatus, *C. et V.* .. 249
24. rubro-punctatus, *C. et V.* . 249
25. celebicus, *Bleek.* 250
26. guttatus, *C. et V.* 250
27. interruptus, *Bleek.* 250
28. chrysospilos, *Bleek.* 250
29. gibbifrons, *Q. et G.* 251
30. periophthalmus, *C. et V.* . 251
31. dussumieri, *C. et V.* 251, 562
32. sumatranus, *Bleek.* 252
33. hendriksii, *Bleek.* 252
34. edentulus, *Schneid.* 252
35. goesii, *Bleek.* 253
36. *æquipinnis, *Gthr.* 253
37. diproctopterus, *Bleek.* ... 254
38. nigricans, *Gill* 254
39. vomerinus, *C. et V.* 254
40. lineatus, *C. et V.* 254
41. quadricornis, *C. et V.* .. 255
42. melanocephalus, *Bleek.* .. 255

Page
43. *fronto, *Gthr.* 255
44. meleagris, *C. et V.* 256
45. *bellus, *Gthr.* 256
46. oortii, *Bleek.* 257
47. bilitonensis, *Bleek.* 257
48. cyanostigma, *Bleek.* 258
49. hasseltii, *Bleek.* 258
50. unicolor, *Rüpp.* 259
vermiculatoides, *Bleek.* .. 239
raaltenii, *Bleek.* 239
kuhlii, *Bleek.* 239
biseriatus, *C. et V.* 240
niger, *Ehrenb.* 240
ruficaudus, *Ehrenb.* 240
guttatus, *Bleek.* 240
kingii, *C. et V.* 240
heteropterus, *Bleek.* 240
cavernosus, *Schneid.* 240
olivaceus, *Blyth* 240
epalzeorhynchus, *Bleek.* . 240
schultzei, *Bleek.* 240
7. Blennophis, *Valenc.* 259
1. webbii, *Val.* 259
8. Neoclinus, *Girard* 259
1. blanchardi, *Girard* 259
2. satiricus, *Girard* 260
9. Cebidichthys, *Ayres* 260
1. violaceus, *Girard* 260
10. Myxodes, *Cuv.* 260
1. viridis, *C. et V.* 260
2. cristatus, *C. et V.* 261
11. Heterostichus, *Girard*.... 261
1. rostratus, *Girard* 261
12. Clinus, *Cuv.* 261
1. nuchipinnis, *Q. et G.* 262
2. xanti, *Gill* 263
3. herminieri, *Lesueur* 264
4. delalandii, *C. et V.* 264
5. brachycephalus, *C. et V.* . 264
6. geniguttatus, *C. et V.* .. 265
7. variolosus, *C. et V.* 265
8. guttulatus, *C. et V.* 266
9. microcirrhis, *C. et V.* 266
10. crinitus, *Jen.* 266
11. *macrocephalus, *Gthr.* .. 266
12. latipinnis, *C. et V.* 267
13. gobio, *C. et V.* 267
14. superciliosus, *L.* 268
15. acuminatus, *C. et V.* 269, 562
16. capensis, *C. et V.* 269
17. cottoides, *C. et V.* 269
18. heterodon, *C. et V.* 270
19. *nematopterus, *Gthr.* .. 270
20. dorsalis, *Bleek.* 271
21. anguillaris, *C. et V.* 271
22. despicillatus, *Rich.* 271

Page
peruvianus, *C. et V.* 261
elegans, *C. et V.* 261
canariensis, *Val.* 262
fasciatus, *Casteln.* 262
fernandezianus, *Guich.* .. 262
13. Cristiceps, *C. et V.* 272
1. argentatus, *Risso* 272
var. antinectes 273, 562
2. xanthosoma, *Bleek.* 273
3. *nasutus, *Gthr.* 273
4. *roseus, *Gthr.* 274
5. australis, *C. et V.* 275
14. *Auchenopterus, *Gthr.* .. 275
1. *monophthalmus, *Gthr.* . 275
2. veranyi, *Filippi* 276
15. Tripterygium, *Risso* 276
1. nasus, *Risso* 276
2. melanurum, *Guich.* 277
3. varium, *Forst.* 277
4. nigripinne, *C. et V.* 277
5. forsteri, *C. et V.* 278
6. *medium, *Gthr.* 278
7. fenestratum, *Forst.* 278
8. trigloides, *Bleek.* 279
16. Dactyloscopus, *Gill* ..279, 560
1. tridigitatus, *Gill* 279, 563
(poeyi, *Gill* .... 563)
2. pectoralis, *Gill* 563
16*a*. Myxodagnus, *Gill* 563
1. opercularis, *Gill* 563
17. Dictyosoma, *Schleg.* 279
1. temminckii, *Bleek.* ..279, 564
18. Gunellichthys, *Bleek.* 280
1. pleurotænia, *Bleek.* 280
19. Stichæus, *Kröyer* 280
1. lumpenus, *Fabr.* 280
2. medius, *Reinh.* 281
2*a*. nubilus, *Richards.* 564
3. maculatus, *Fries* 281
4. islandicus, *Walb.* 281
5. aculeatus, *Reinh.* 282
6. anguillaris, *Pall.* 282
7. punctatus, *Fabr.* 283
8. unimaculatus, *Reinh.* 283
9. hexagrammus, *Schleg.* .. 284
subbifurcatus, *Storer* 280
20. Blenniops, *Nilss.* 284
1. ascanii, *Walb.* 284
21. Centronotus, *Bl.* 285
1. gunellus, *L.* 285, 564
2. fasciatus, *Bl.* 287, 564
3. nebulosus, *Schleg.* 287
4. apus, *C. et V.* 288
5. *gunelliformis, *Rüpp.* .. 288
6. dolichogaster, *Pall.* 288
7. alectrolophus, *Pall.* 289

Page
9. roseus, *Pall.* 290
mucronatus, *Mitch.* 285
tænia, *Pall.* 285
ruberrimus, *C. et V.* 285
polyactocephalus, *Pall.* .. 285
crassispina, *Schleg.* 285
macrocephalus, *Gir.* 285
affinis, *Reinh.* 285
21 *a*. Anoplarchus, *Gill* 564
1. *crista galli, *Gthr.* .. 289, 564
22. Apodichthys, *Girard* 290
1. flavidus, *Girard* 290
23. Xiphidion, *Girard* 291
1. mucosum, *Girard* 291
24. Cryptacanthodes, *Storer* .. 291
1. maculatus, *Storer* 291
25. Patæcus, *Richards.* 292
1. fronto, *Richards.* 292
2. *maculatus, *Gthr.* 292
26. Pholidichthys, *Bleek.* 293
1. leucotænia, *Bleek.* 293
27. Andamia, *Blyth* 294
1. expansa, *Blyth* 294
28. Genypterus, *Philippi* 294
1. chilensis, *Guich.* 294
29. Zoarces, *Cuv.* 295
1. viviparus, *L.* 295
2. anguillaris, *Peck* 296
americanus, *Bl.* 295
Blennius polaris, *Sabine.* . 295
30. Nemophis, *Kaup* 296
1. lessonii, *Kaup* 296
31. Pseudoblennius, *Schleg.* .. 297
1. percoides, *Gthr.* 297

Fam. 25. ACANTHOCLINIDÆ.

1. Acanthoclinus, *Jen.* 297
1. littoreus, *Forst.* 298

Fam. 26. COMEPHORIDÆ.

1. Comephorus, *Lacép.* 299
1. baikalensis, *Lacép.* 299

Fam. 27. TRACHYPTERIDÆ.

1. Trachypterus, *Gouan* 300
1. spinolæ, *C. et V.* 300
2. cristatus, *Bonelli* 301
(müllerianus, *Risso* .... 301)
3. gryphurus, *Lowe* 301
4. tænia, *Schn.* 302
5. altivelis, *Kner* 303
6. iris, *Walb.* 303
7. leiopterus, *C. et V.* 304
8. *rüppellii, *Gthr.* 304
9. arcticus, *Brünn.* 305

Page
2. Stylophorus, *Shaw* 306
1. chordatus, *Shaw* 306
3. Regalecus, *Brünn.* 307
1. gladius, *Walb.* 308
(capensis, *C. et V.* 308)
2. telum, *C. et V.* 309
3. banksii, *C. et V.* 309
4. glesne, *Ascan.* 310
5. grillii, *Lindr.* 311
6. russellii, *Shaw* 311

Fam. 28. LOPHOTIDÆ.

1. Lophotes, *Giorna* 312
1. cepedianus, *Giorna* 312
(capellei, *Schleg.* 312)

Fam. 29. TEUTHIDIDÆ.

1. Teuthis, *L.* 313
1. javus, *L.* 315
2. canaliculata, *Mungo Park* 316
3. concatenata, *C. et V.* 316
4. corallina, *C. et V.* 316
5. vermiculata, *K. et v. H.* 317
6. labyrinthodes, *Bleek.* 317
7. sutor, *C. et V.* 317
8. margaritifera, *C. et V.* 317
9. tumifrons, *C. et V.* 317
10. dorsalis, *C. et V.* 318
11. oramin, *Bl. Schn.* 318
12. albopunctata, *Schleg.* 318
13. *striolata, *Gthr.* 319
14. hexagonata, *Bleek.* 320
15. guttata, *Bl.* 320
16. stellata, *Forsk.* 320
17. notosticta, *Richards.* 320
18. fuscescens, *Houtt.* 321
19. lurida, *Ehrenb.* 321
20. nebulosa, *Q. et G.* 321
21. argentea, *Q. et G.* 322
22. marmorata, *Q. et G.* 322
23. lineata, *C. et V.* 322
24. sigana, *Forsk.* 322
25. tetrazona, *Bleek.* 323
26. doliata, *Cuv.* 323
27. puella, *Schleg.* 323
28. virgata, *C. et V.* 323
29. vulpina, *Schleg.* 324
russelii, *C. et V.* 313
firmamentum, *C. et V.* 313
abhortani, *C. et V.* 313
mertensii, *C. et V.* 313
rostratus, *C. et V.* 313
guamensis, *C. et V.* 313
olivaceus, *C. et V.* 313
kopsii, *Bleek.* 313
Page
chrysospilos, *Bleek.* 313
melanospilos, *Bleek.* 313

Fam. 30. ACRONURIDÆ.

1. Acanthurus, *Bl. Schn.* 325
1. triostegus, *L.* 327
(pentazona, *Bleek.* 329)
2. guttatus, *Forst.* 329
3. chirurgus, *Bl.* 329
4. matoides, *C. et V.* 330
(lamarrii, *C. et V.* 331)
5. nigrofuscus, *Forsk.* 331
6. *bipunctatus, *Gthr.* 331
7. nigros, *C. et V.* 332
8. doreensis, *C. et V.* 332
9. chrysosoma, *Bleek.* 332
10. rubropunctatus, *Rüpp.* 333
11. marginatus, *C. et V.* 333
12. lineatus, *L.* 333
13. striatus, *Q. et G.* 334
14. sohal, *Forsk.* 334
15. undulatus, *C. et V.* 335
16. dussumieri, *C. et V.* 335
17. grammoptilus, *Richards.* 335
18. bleekeri, *Gthr.* 335
19. cæruleus, *Bl. Schn.* 336
20. lineolatus, *C. et V.* 336
21. olivaceus, *Bl. Schn.* 336
22. pyroferus, *Kittl.* 337
23. *tennentii, *Gthr.* 337
24. gahm, *Forsk.* 338
25. nummifer, *C. et V.* 338
26. glaucopareius, *C. et V.* 339
27. celebicus, *Bleek.* 339
28. fuscus, *Steindachner* 339
29. leucosternon, *Benn.* 340
30. achilles, *Shaw* 340
31. triangulus, *C. et V.* 341
32. fraterculus, *C. et V.* 341
33. hepatus, *L.* 341
34. strigosus, *Benn.* 342
35. ctenodon, *C. et V.* 342
36. rhombeus, *Kittl.* 342
37. goramensis, *Bleek.* 343
38. xanthurus, *Blyth* 343
39. gemmatus, *C. et V.* 343
40. velifer, *Bl.* 344
41. hypselopterus, *Bleek.* 344
42. desjardinii, *Benn.* 344
43. rüppellii, *Benn.* 345
44. suillus, *C. et V.* 345
flavoguttatus, *Kittl.* 325
bahianus, *Casteln.* 325
brevis, *Poey* 325
tractus, *Poey* 325

Page
2. *Acronurus, _Gthr._ 345
  1. orbicularis, _C. et V._ 346
  2. melanurus, _C. et V._ 346
  3. *brevispinis, _Gthr._ 346
  4. argenteus, _Q. et G._ 346
     melas, _C. et V._ 345
3. Prionurus, _Lacép._ 347
  1. microlepidotus, _Lacép._ .. 347
  2. scalprum, _Langsd._ 347
  3. laticlavius, _Val._ 347
4. Naseus, _Commers._ 347
  1. unicornis, _Forsk._ 348
  2. brachycentron, _C. et V._ .. 349
  3. tripeltes, _C. et V._ 349
  4. brevirostris, _C. et V._ 349
  5. olivaceus, _Soland._ 352
  6. annulatus, _Q. et G._ 352
  7. tuberosus, _Lacép._ 353
  8. lituratus, _Forst._ 353
  9. hexacanthus, _Bleek._ 355
  10. tapeinosoma, _Bleek._ 355
  11. thynnoides, _C. et V._ 355
     punctulatus, _C. et V._ 347
     unicolor, _Liénard_ 347
5. Keris, _C. et V._ 355
  1. anginosus, _C. et V._ 356
  2. amboinensis, _Bleek._ 356

Fam. 31. HOPLOGNATHIDÆ.

1. Hoplognathus, _Richards._ .. 357
  1. conwayii, _Richards._ 357
  2. fasciatus, _Schleg._ 357
  3. punctatus, _Schleg._ 358

Fam. 32. MALACANTHIDÆ.

1. Malacanthus, _Cuv._ 359
  1. plumieri, _Bl._ 359
  2. latovittatus, _Lacép._ 360
  3. hoedtii, _Bleek._ 361

Fam. 33. NANDIDÆ.

First Group. PLESIOPINA.

1. Plesiops, _Cuv._ 363
  1. nigricans, _Rüpp._ 363
  2. cæruleo-lineatus, _Rüpp._ .. 363
  3. corallicola, _K. et v. H._ 364
  4. oxycephalus, _Bleek._ 364
  5. *bleekeri, _Gthr._ 364
2. *Trachinops, _Gthr._ 366
  1. *tæniatus, _Gthr._ 366

Second Group. NANDINA.

3. Badis, _Bleek._ 367
  1. buchanani, _Bleek._ 367
  2. dario, _B. H._ 367
4. Nandus, _C. et V._ 367
  1. marmoratus, _C. et V._ 367
  2. nebulosus, _Bleek._ 368
5. Catopra, _Bleek._ 368
  1. fasciata, _Bleek._ 368
  2. nandoides, _Bleek._ 368
  3. grootii, _Bleek._ 369

Third Group. ACHARNINA.

6. Acharnes, _M. et T._ 369
  1. speciosus, _M. et T._ 369

Fam. 34. POLYCENTRIDÆ.

1. Polycentrus, _M. et T._ 370
  1. schomburgkii, _M. et T._ .. 370
  2. tricolor, _Gill_ 371
2. Monocirrhus, _Heckel_ 371
  1. polyacanthus, _Heck._ 371

Fam. 35. LABYRINTHICI.

1. Spirobranchus, _C. et V._ 373
  1. capensis, _C. et V._ 373, 564
2. Ctenopoma, _Peters_ 373, 566
  1. multispine, _Pet._ 373
  2. *microlepidotum, _Gthr._... 565
3. Anabas, _Cuv._ 374
  1. scandens, _Dald._ 375
  2. *macrocephalus, _Bleek._.. 376
  3. oligolepis, _Bleek._ 376
  4. microcephalus, _Bleek._.... 377
     variegatus, _Bleek._ 374
4. Helostoma, _K. et v. H._ 377
  1. temminckii, _K. et v. H._ 377, 566
5. Polyacanthus, _K. et v. H._ .. 378
  1. hasseltii, _C. et V._ 378
  2. einthovenii, _Bleek._...... 378
  3. helfrichii, _Bleek._ 379
  4. opercularis, _L._ 379
  5. *signatus, _Gthr._ 379, 566
  6. cupanus, _C. et V._........ 381
  7. deissneri, _Bleek._........ 381
6. Macropus, _Lacép._ 381
  1. viridi-auratus, _Lacép._ .. 382
7. Osphromenus, _Commers._ .. 382
  1. olfax, _Commers._........ 382
  2. trichopterus, _Pall._ 384
  3. *siamensis, _Gthr._ 385
  4. *microlepis, _Gthr._ 385
  5. striatus, _Bleek._ 386
8. Trichogaster, _Schn._ 387
  1. fasciatus, _Schn._ 387
  2. unicolor, _C. et V._ 388
     sota, _B. H._ 387
     chuna, _B. H._ 387

Page
9. Betta, *Bleek.* 388
    1. trifasciata, *Bleek.* 388
    2. pugnax, *Cant.* 389

Fam. 36. LUCIOCEPHALIDÆ.

1. Luciocephalus, *Bleek.* 390
    1. pulcher, *Gray* 390

Fam. 37. ATHERINIDÆ.

First Group. ATHERININA.

1. Atherina, *Artedi* 392
    1. presbyter, *Cuv.* 392
    2. pontica, *Eichw.* 393
    3. hepsetus, *L.* 393
    4. lacustris, *Bonap.* 394
    5. boyeri, *Risso* 394
    6. martinica, *C. et V.* 395
    7. breviceps, *C. et V.* 395
    8. parvipinnis, *C. et V.* 396
    9. mocho, *C. et V.* 396
    10. hepsetoides, *Richards.* .. 397
    11. presbyteroides, *Richards.* 397
    12. forskålii, *Rüpp.* 397
    13. bleekeri, *Gthr.* 398
    14. afra, *Peters* 398
    15. valenciennesii, *Bleek.* 398
    16. pinguis, *Lacép.* 399
        (lacunosa, *Forst.* ...... 399)
    17. lacunosa, *Bleek.* 400
    18. duodecimalis, *Bleek.* 400
    19. stipes, *M. et T.* 400
    20. endrachtensis, *Q. et G.* .. 401
    21. brachyptera, *Bleek.* 401
    22. *microstoma, *Gthr.* 401
    23. *pauciradiata, *Gthr.* 401
        rissoi, *C. et V.* 392
        sarda, *C. et V.* 392
        carolina, *C. et V.* 392
        waigiensis, *Q. et G.* 392
        temminckii, *Bleek.* 392
        argyrotæniata, *Bleek.* 392
        bimanensis, *Bleek.* 392
        tæniata, *Agass.* 392
        punctata, *Benn.* 392
        caspia, *Eichw.* 392
2. Atherinichthys, *Bleek.* 402
    1. jacksoniana, *Q. et G.* 402
    2. laticlavia, *C. et V.* 402
    3. microlepidota, *Jen.* 403
    4. nigricans, *Richards.* 403
    5. *alburnus, *Gthr.* 404
    6. humboldtii, *C. et V.* 404
    7. bonariensis, *C. et V.* 404
        (lichtensteinii, *C. et V.* ..404)
    8. brasiliensis, *Q. et G.* 404
    9. incisa, *Jen.* 405
    10. argentinensis, *C. et V.* .. 405
    11. *gracilis, *Gthr.* 405
    12. menidia, *L.* 406
    13. notata, *Mitch.* 406
    14. californiensis, *Girard* 406
    15. nigrans, *Richards.* 406
        lessonii, *C. et V.* 402

Second Group.
TETRAGONURINA.

3. Tetragonurus, *Risso* 407
    1. cuvieri, *Risso* 407

Fam. 38. MUGILIDÆ.

1. Mugil, *Artedi* 409
    1. cephalus, *Cuv.* 417
    2. lineatus, *Mitch.* 417
    3. constantiæ, *C. et V.* 418
    4. cephalotus, *C. et V.* 419
    5. rammelsbergii, *Tschudi* .. 420
    6. *dobula, *Gthr.* 420
    7. hæmatochilus, *Schleg.* .. 422
    8. perusii, *C. et V.* 422
    9. liza, *C. et V.* 423
    10. subviridis, *C. et V.* 423
    11. *nepalensis, *Gthr.* 424
    12. argenteus, *Q. et G.* 424
    13. sundanensis, *Bleek.* 425
    14. strongylocephalus, *Rich.* . 425
    15. parsia, *Buch. Ham.* 426
    16. belanak, *Bleek.* 427
    17. planiceps, *C. et V.* 428
    18. *longimanus, *Gthr.* 428
    19. *kelaartii, *Gthr.* 429
    20. engeli, *Bleek.* 430
    21. cantoris, *Bleek.* 430
    22. brasiliensis, *Agass.* 431
    23. *robustus, *Gthr.* 432
    24. *affinis, *Gthr.* 433
    25. ophuysenii, *Bleek.* 434
    26. cunnesius, *C. et V.* 434
    27. speigleri, *Bleek.* 435
    28. waigiensis, *Q. et G.* 435
        (rossii, *Bleek.* ....436)
    29. *suppositus, *Gthr.* 437
    30. *octoradiatus, *Gthr.* 437
    31. curtus, *Yarr.* 439
    32. capito, *Cuv.* 439
        (dubahra, *C. et V.* ......440)
    33. richardsonii, *Smith* 440
    34. *petherici, *Gthr.* 441
    35. auratus, *Risso* 442
    36. saliens, *Risso* 443
        (capensis, *C. et V.* ......443)

Page
37. multilineatus, _Smith_ 443
38. cryptochilus, _C. et V._ 444
39. axillaris, _Bleek._ 444
40. cæruleomaculatus, _Bleek._ 445
41. *bleekeri, _Gthr._ 445
42. *ceylonensis, _Gthr._ 446
43. smithii, _Gthr._ 447
44. troschelii, _Bleek._ 448
45. borneensis, _Bleek._ 448
46. ceramensis, _Bleek._ 449
47. oligolepis, _Bleek._ 449
48. *hypselopterus, _Gthr._ 450
49. *compressus, _Gthr._ 451
50. melinopterus, _C. et V._ .. 452
51. *decemradiatus, _Gthr._ .. 452
52. peronii, _C. et V._ 452
53. falcipinnis, _C. et V._ 453
54. broussonetii, _C. et V._ 453
55. labeo, _Cuv._ 453
56. labiosus, _C. et V._ 454
57. chelo, _Cuv._ 454
58. *septentrionalis, _Gthr._ .. 455
59. *nigrostrigatus, _Gthr._ 457
60. heterochilus, _Bleek._ 457
61. crenilabis, _Forsk._ 458
62. macrochilus, _Bleek._ 458
63. *rüppellii, _Gthr._ 458
64. cirrhostoma, _Forsk._ 459
65. *proboscideus, _Gthr._ 459
66. corsula, _Buch. Ham._ 460
plumieri, _Bl._ 409
albula, _L._ 410
breviceps, _C. et V._ 410
borbonicus, _C. et V._ 410
cylindricus, _C. et V._ 410
cascasia, _Buch. Ham._ 410
carinatus, _Ehrenb._ 410
scheli, _Forsk._ 410
tade, _Forsk._ 410
buchanani, _Bleek._ 410
valenciennesii, _Bleek._ .. 410
bontah, _Russ._ 410
pedaraki, _C. et V._ 410
acutus, _C. et V._ 410
melancranus, _Rich._ 410
ventricosus, _Rich._ 410
chaptalii, _Eyd. et Soul._ .. 410
lauvergnii, _Eyd. et Soul._ .. 410
grandisquamis, _C. et V._ .. 410
parmatus, _Cant._ 410
berlandieri, _Girard_ 410
2. Agonostoma, _Benn._ 461
1. plicatile, _C. et V._ 461
2. oxyrhynchum, _C. et V._ .. 461
3. telfairii, _Benn._ 462
4. dobuloides, _C. et V._ 462

Page
5. *microps, _Gthr._ 462
6. *nasutum, _Gthr._ 463
7. monticola, _Bancr._ 464
8. *percoides, _Gthr._ 464
9. forsteri, _Schn._ 465
3. Myxus, _Gthr._ 466
1. *elongatus, _Gthr._ 466
2. *harengus, _Gthr._ 467
3. curvidens, _C. et V._ 467
4. ciliilabis, _C. et V._ 467

Fam. 39. OPHIOCEPHALIDÆ.

1. Ophiocephalus, _Bl._ 468
1. punctatus, _Bl._ 469
2. *affinis, _Gthr._ 470
3. gachua, _Buch. Ham._ 471
(aurantiacus, _Buch. Ham._ 471)
4. *kelaartii, _Gthr._ 472
5. rhodotænia, _Bleek._ 472
6. mystax, _Bleek._ 473
7. melanosoma, _Bleek._ 473
8. melanopterus, _Bleek._ 473
9. cyanospilos, _Bleek._ 474
10. striatus, _Bl._ 474
11. polylepis, _Bleek._ 475
12. bankanensis, _Bleek._ 475
13. lucius, _K. et v. H._ 475
14. *siamensis, _Gthr._ 476
15. *obscurus, _Gthr._ 476
16. barca, _Buch. Ham._ 477
17. nigricans, _C. et V._ 477
18. grandinosus, _C. et V._ 478
19. marulius, _Buch. Ham._ .. 478
20. *pseudomarulius, _Gthr._ .. 478
21. marulioides, _Bleek._ 479
22. pleurophthalmus, _Bleek._ .. 479
23. argus, _Cant._ 480
24. maculatus, _Lacép._ 480
25. micropeltes, _K. et v. H._ .. 482
(stevensii, _Bleek._ .... 482)
sowara, _C. et V._ 468
ocellatus, _Lacép._ 468
miliaris, _C. et V._ 469
iris, _C. et V._ 469
jovis, _Richards._ 469
theophrasti, _Val._ 469
leucopunctatus, _Sykes_ .. 469
2. Channa, _Gron._ 483
1. orientalis, _Schn._ 483, 566

Fam. 40. TRICHONOTIDÆ.

1. Trichonotus, _Schn._ 484
1. setigerus, _Schn._ 484
2. Hemerocoetes, _C. et V._ 485
1. acanthorhynchus, _Forst._ .. 485

Fam. 41. CEPOLIDÆ.

Page
1. Cepola, *L.* 486
  1. rubescens, *L.* 486
  2. schlegelii, *Bleek.* 488
  3. abbreviata, *C. et V.* 488
  4. krusensternii, *Schleg.* 488
  5. mesoprion, *Bleek.* 488
  6. marginata, *C. et V.* 489
  7. limbata, *C. et V.* 489
  striata, *Schn.* 486

Fam. 42. GOBIESOCIDÆ.

1. Chorisochismus, *Barnev.* 490
  1. dentex, *Pall.* 490
2. Sicyases, *Müll. et Trosch.* 494
  1. sanguineus, *M. et T.* 494
  2. fasciatus, *Pet.* 497
  3. chilensis, *Barnev.* 497
3. Cotylis, *M. et T.* 497
  1. fimbriata, *M. et T.* 498
  ventricosa, *Pall.* 498
  stelleri, *Pall.* 499
4. Gobiesox, *Lacép.* 499
  1. cephalus, *Lacép.* 499, 566
  2. *macrophthalmus, *Gthr.* 502
  3. nigripinnis, *Pet.* 502
  4. nudus, *Bl.* 502
  5. pœcilophthalmus, *Jen.* 503
  6. marmoratus, *Jen.* 504
  7. mæandricus, *Girard* 505
5. *Diplocrepis, *Gthr.* 506
  1. puniceus, *Rich.* 506
6. *Crepidogaster, *Gthr.* 507
  1. *tasmaniensis, *Gthr.* 507
  2. *spatula, *Gthr.* 508
7. Trachelochismus, *Barnev.* 509
  1. pinnulatus, *Forst.* 509
8. Lepadogaster, *Gouan* 510
  1. gouanii, *Lacép.* 510
  2. candollii, *Risso* 513
  3. wildenovii, *Risso* 514
  4. bimaculatus, *Penn.* 514
  brownii, *Risso* 510
  rafinesquii, *Costa* 510
  latirostris, *Costa* 510
9. Leptopterygius, *Trosch.* 515
  1. piger, *Nardo* 515

Fam. 43. PSYCHROLUTIDÆ.

Page
1. *Psychrolutes, *Gthr.* 516
  1. *paradoxus, *Gthr.* 516

Fam. 44. CENTRISCIDÆ.

1. Centriscus, *L.* 518
  1. scolopax, *L.* 518
  2. gracilis, *Lowe* 521
  3. humerosus, *Richards.* 522
  4. velitaris, *Pall.* 524
2. Amphisile, *Klein* 524
  1. scutata, *L.* 525
  2. punctulata, *Bianc.* 527
  3. *strigata, *Gthr.* 528, 566

Fam. 45. FISTULARIDÆ.

1. Fistularia, *L.* 529
  1. tabaccaria, *L.* 529
  2. serrata, *Bl.* 533
2. Aulostoma, *Lacép.* 535
  1. coloratum, *M. et T.* 536
  2. chinense, *L.* 538

Fam. 46. MASTACEMBELIDÆ.

1. Rhynchobdella, *Schn.* 539
  1. aculeata, *Bl.* 540
2. Mastacembelus, *Gronov.* 540
  1. pancalus, *Buch. Ham.* 541
  2. zebrinus, *Blyth* 541
  3. aleppensis, *Schn.* 541
  4. unicolor, *K. et v. H.* 542
  5. erythrotænia, *Bleek.* 542
  6. *argus, *Gthr.* 542
  7. armatus, *Lacép.* 542
  8. maculatus, *Reinw.* 543

Fam. 47. NOTACANTHI.

1. Notacanthus, *Bl.* 544
  1. nasus, *Bl.* 544
  2. bonapartii, *Risso* 545
  3. mediterraneus, *Fil. et Ver.* 545
  4. sexspinis, *Richards.* 545, 566
  5. rissoanus, *Fil. et Ver.* 545

ERRATUM.

Page 5.—41. Bostrychus sinensis, *Lacép.* &c., is to be erased.

CATALOGUE

OF

FISHES.

Order I. ACANTHOPTERYGII.

(*CONTINUED.*)

Fam. 19. GOBIIDÆ.

Gobioidei, pt., *Cuv. Règne Anim.*
Gobioidei, *Müll. Berl. Abhandl.* 1844, p. 201.
Gobiidæ, *Owen, Lect. Comp. Anat.* i. p. 49.

Body elongate, low, naked or scaly. Teeth generally small, sometimes with canines. The infraorbital ring does not articulate with the præoperculum. The two dorsal fins separated or more or less united*, *the spinous portion being always the less developed and composed of flexible spines ; the anal similarly developed as the soft dorsal ; ventrals with one spine and five rays*† ; *sometimes both ventrals united into a disk. Gill-opening more or less narrow,* the gill-membranes being attached to the isthmus ; four gills ; pseudobranchiæ. *A prominent papilla near the vent*‡. Air-bladder generally absent. *Pyloric appendages none.*

Carnivorous fishes, living at the bottom of the shores and of the fresh waters of the temperate and tropical regions. This family offers numerous instances of the fact, that a part of the individuals of one and the same species are entirely confined to fresh waters, whilst others live in the sea.

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* No spinous portion can be distinguished in *Luciogobius*, a genus but imperfectly known.

† Four in *Trypauchen*, *microcephalus* and *Trypauchenichthys*.

‡ No anal papilla in *Asterropteryx*.

Synopsis of the Groups.

Ventral fins united into one disk, or situated close together; two separate dorsal fins	*a.* **Gobiina.**
The two dorsal fins united into one. Vertebræ 11/17	*b.* **Amblyopina.**
The two dorsal fins united into one. Vertebræ 10/24	*c.* **Trypauchenina.**
Ventral fins widely apart from each other; two separate dorsal fins	*d.* **Callionymina.**

Appendix.—LUCIOGOBIUS. OXYMETOPON.

Synopsis of the Genera.

First group: **Gobiina.**

* *Ventrals united into one fin.*

Ventral not adherent to the belly. Body scaly. Teeth conical, fixed, those of the upper jaw in several series	1. GOBIUS, p. 3.
Ventral not adherent to the belly. Body scaly. Teeth conical, fixed, those of the upper jaw in a single series; canine teeth none	2. EUCTENOGOBIUS, p. 79.
Ventral not adherent to the belly. Body scaly. The upper jaw with a series of long teeth, behind which are two groups of strong canine teeth	3. LATRUNCULUS, p. 80.
Ventral not adherent to the belly. Body scaly. Teeth conical, fixed, those of the upper jaw in a single series; canine teeth at least in the lower jaw	4. APOCRYPTES, p. 80.
Ventral not adherent to the belly. Body scaly. Teeth of the upper jaw in a single series, emarginate, those of the lower horizontal	5. EVORTHODUS, p. 84.
Body naked, cylindrical; head not compressed. Teeth conical, fixed	6. GOBIOSOMA, p. 85.
Head and body naked, compressed. Teeth fixed, conical, lower jaw generally with two canines near the symphysis	7. GOBIODON, p. 87.
Ventral not adherent to the belly. Body scaly. Teeth erect in both jaws, in a single series and tricuspid	8. TRIÆNOPHORICHTHYS, p. 89.
Body tubercular. Gill-openings reduced to a small foramen	9. BENTHOPHILUS, p. 91.
Ventral short, adherent to the belly. Body scaly. Teeth of the upper jaw moveable, in a single series	10. SICYDIUM, p. 91.
Ventral short, adherent to the belly. Body naked. Teeth of the upper jaw tricuspid, in a single series	11. LENTIPES, p. 96.

** *Ventral fins close together, but more or less completely disconnected.*

Eyes very close together and very prominent. Teeth erect in both jaws	12. PERIOPHTHALMUS, p. 96.
Eyes very close together and very prominent. Lateral teeth of the lower jaw horizontal	13. BOLEOPHTHALMUS, p. 101.
Eyes not prominent; anal papilla distinct	14. ELEOTRIS, p. 105.
Head and body compressed; anal papilla absent	15. ASTERROPTERYX, p. 132.

Second Group: **Amblyopina.**

Anterior teeth very strong	16. AMBLYOPUS, p. 133.

Third Group: **Trypauchenina.**

Ventrals united into one disk	17. TRYPAUCHEN, p. 137.
Ventrals completely disconnected	18. TRYPAUCHENICHTHYS, p. 137.

Fourth Group: **Callionymina.**

Gill-openings of moderate width; præoperculum not armed	19. PLATYPTERA, p. 138.
Gill-openings reduced to a small opening; præoperculum armed. None of the ventral rays detached	20. CALLIONYMUS, p. 138.
The outer ventral ray detached	21. VULSUS, p. 151.

Appendix.

Ventral fins united. One short dorsal fin. Body naked	LUCIOGOBIUS, p. 152.
Ventral fins separated, 1/4. Two dorsal fins; head compressed into a fleshy crest	OXYMETOPON, p. 153.

First Group. GOBIINA.

Ventral fins united into one disk, or situated close together; two separate dorsal fins. Vertebræ $\frac{11-12}{16-15}$.

1. GOBIUS*.

Gobius, *Artedi, Genera*, p. 28.
Gobius, sp., *Cuv. Règne Anim.*
Chæturichthys, *Richards. Voy. Sulph. Fishes*, p. 54.
Gobionellus, *Girard in Proc. Acad. Nat. Sc. Philad.* 1858, p. 168.
Oxyurichthys, *Bleek. Enumer. Spec.* p. 120.

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* *a.* Doubtful species apparently allied to *G. niger*, *G. paganellus*, or *G. capito*.

1. Gobius guttatus, *Cuv. & Val.* xii. p. 24; *Guichen. Explor. Algér. Poiss.* p. 76.—Mediterranean.
2. —— limbatus, *Cuv. & Val.* xii. p. 26. pl. 344.—Nice. 3.

Ctenogobius, *Gill, Ann. Lyc. Nat. Hist. New York*, 1858, pp. 374, 430.
Acanthogobius, *Gill in Ann. Lyc. Nat. Hist. New York*, and *Proc. Acad. Nat. Sc. Philad.* 1859, p. 145.
Rhinogobius, *Gill in Ann. Lyc. Nat. Hist. New York*, and *Proc. Acad. Nat. Sc. Philad.* 1859, p. 145.
Chænogobius, *Gill in Ann. Lyc. Nat. Hist. New York*, 1859, p. 12.
Lepidogobius, *Gill, ibid.* p. 14.

Body more or less elongate, scaly. Teeth in several series in the upper jaw, conical and fixed, generally small, sometimes with canines. Two dorsal fins: the anterior with six, rarely with five or more flexible spines; the posterior of greater, and sometimes of much greater, extent than the anterior. Anal similar to the posterior dorsal in form and size, terminating at some distance from the caudal. Ventral fins united to a disk, which is not attached to the belly.

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3. Gobius lugens, *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 414, *Poiss.* pl. 9. f. 1.—River Codor.
4. —— caspius, *Eichw. Zool. Spec.* iii. p. 76, and *Bull. Soc. Nat. Moscou*, 1838, p. 144.—Caspian Sea.
5. —— affinis, *Eichw. Zool. Spec.* iii. p. 75, and *Bull. Soc. Nat. Moscou*, 1838, p. 143.—Caspian Sea.
6. —— reticulatus, *Eichw. Zool. Spec.* iii. p. 77.—Odessa.
7. —— ephippiatus, *Lowe, Proc. Zool. Soc.* 1839, p. 84, and *Trans. Zool. Soc.* iii. p. 10.—Madeira.
8. —— fluviatilis, *Pall. Zoogr.* iii. p. 162; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 429.—Rivers of Southern Russia.
9. —— cephalarges, *Pall. Zoogr.* iii. p. 155; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 420, *Poiss.* pl. 12. f. 2.—Black Sea.
10. —— constructor, *Nordm. l. c.* p. 427. pl. 9. f. 2.—Rivers of South Russia.
11. —— virescens, *Pall. Zoogr.* iii. p. 158; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 417.—Black Sea.
12. —— chilo, *Pall. l. c.*; *Nordm. l. c.* p. 418.—Black Sea.
13. —— fuliginosus, *M'Coy in Ann. & Mag. Nat. Hist.* 1841, vi. p. 403.—Connemara (Ireland).

β. Doubtful species apparently allied to *G. jozo.*

14. Gobius quadricapillus, *Pall. Zoogr.* iii. p. 159; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 433, *Poiss.* pl. 13. f. 3.—Sebastopol.
15. —— macropterus, *Nordm. l. c.* p. 434. pl. 13. f. 2.—South coast of the Crimea.

γ. Species apparently allied to *G. elegans.*

16. Gobius olivaceus, *Schleg. Faun. Japon. Poiss.* p. 143. pl. 74. f. 3.—Japan.
17. —— richardsonii, *Bleek. Sumatra*, iii. p. 508.—Rivers of Sumatra.
18. —— kuhlii, *Bleek. Blenn. en Gob.* p. 251. f. 9.—Rivers of Bantam.
19. —— tylankahanensis, *Bleek. Blenn. en Gob.* p. 251. f. 12.—Rivers of Bantam.
20. —— pœcilosoma, *Bleek. Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* p. 31, and *Banten*, p. 320.—Coast of Java.

δ. Species apparently allied to *G. kokius.*

21. Gobius eleotrioides, *Bleek. Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* p. 25.—Batavia.

ε. Doubtful species apparently allied to *G. caninus.*

22. Gobius quadriporns, *Cuv. & Val.* xii. p. 87.—Surinam?
23. —— brevifilis, *Cuv. & Val.* xii. p. 90.—Pondicherry.
24. —— janthinopterus, *Bleek. Ceram*, ii. p. 702.—Ceram.

Anal papilla generally distinct. Gill-opening vertical, of moderate width, the gill-membranes being united to the isthmus; branchiostegals five; gills four, pseudobranchiæ; air-bladder none, or, if present, very small. Pyloric appendages none. Vertebræ $\frac{11-12}{15-16}$.

Found on all the coasts of the temperate and tropical regions, many species entering fresh waters, and some entirely confined to them.

The attempts to divide the numerous species of this genus into smaller groups have failed to establish natural genera. The characters which may be used for that purpose—as the form of the body, the structure and size of the scales, modifications of the dentition, extent of the fins, presence or absence of barbels—either show gradual transitions between the most extreme forms, or such species are

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25. Gobius goldmanni, *Bleek. Timor*, p. 167.—Timor Kupang.
26. —— chlorostigma, *Bleek. Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* p. 27.—Coast of Java.
27. —— modestus, *Bleek. Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* p. 28.—Java.
28. —— ripilepis, *Richards. Ichth. Chin.* p. 205.—China.
29. —— pflaumii, *Bleek. Verhand. Batav. Genootsch.* xxv., *Japan*, p. 42. f. 3. —Nagasaki.
30. Rhinogobius similis, *Gill, Proc. Acad. Nat. Sc. Philad.* 1859, p. 145.—Japan.

ζ. Doubtful species apparently allied to *G. acutipinnis.*

31. Gobius melanostigma, *Bleek. Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* p. 32.—Sea of Batavia.

η. Doubtful species apparently allied to *G. ocellaris.*

32. Gobius nigripinnis, *Cuv. & Val.* xii. p. 101.—Bourbon.
33. —— pallidus, *Cuv. & Val.* xii. p. 102.—Ile de France.
34. —— guamensis, *Cuv. & Val.* xii. p. 103.—Guam.
35. —— chiloensis, *Guichen. in Gay, Hist. Chile, Zool.* ii. p. 293. lam. 6 *b.* f. 1.—Chiloe.
36. —— stamineus, *Val. Voy. Bonite, Poiss.* p. 179. pl. 5. f. 5.—Sandwich Islands.
37. —— blokzeyli, *Bleek. Natuurk. Tydschr. Nederl. Ind.* vol. —, *Bali*, iv.—Rivers of Bali.—Very nearly allied to *G. grammepomus* or *G. gymnopomus.*
38. —— cæruleus, *Liénard, Dix. Rapp. Soc. Hist. Nat. Maur.* p. 38.—Mauritius.

θ. Species apparently allied to *G. brunneus.*

39. Gobius platycephalus, *Richards. Ichth. Chin.* pp. 204, 318.—China.

ι. Doubtful species apparently allied to *G. phalæna.*

40. Gobius papilio, *Cuv. & Val.* xii. p. 91.—Ile de France.
41. Bostrychus sinensis, *Lacép.* iii. pp. 140, 141. pl. 14. f. 2.—Gobius sinensis, *Cuv. & Val.* xii. p. 94.—China.

κ. Doubtful species apparently allied to *G. arabicus.*

42. Gobius mertensii, *Cuv. & Val.* xii. p. 110.—*Hab.* ——?
43. —— pavoninoides, *Bleek. Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* p. 33.—Sea of Madura.

λ. Species apparently allied to *G. lanceolatus.*

44. Gobius smaragdus, *Cuv. & Val.* xii. p. 120.—Cuba 45.

united by them as are otherwise entirely different from one another. Any one who should extend his examinations to a great number of species would soon become aware of the fruitlessness of such attempts, by which neither a natural arrangement is effected, nor the determination of the species facilitated. A generic separation of those species which are entirely devoid of scales, or which have the teeth tricuspid or in a single series, appears to be the most justifiable.

Synopsis of the Species.

I. The anterior dorsal with five or six spines.
  A. Scales large or of moderate size, fifty or less in a longitudinal series.
    1. A longitudinal crest on the nape, p. 8.
      1. G. cyprinoides.
    2. No crest on the head.
      a. Caudal fin rounded, not elongate.
        aa. Canine teeth none.
          a. Head longer than high.
            aa. The second dorsal with eleven or more rays.
              * Head longer than broad, p. 9.

2. G. ratan.
3. G. syrman.
4. G. semilunaris.
5. G. melanio.
6. G. sulcatus.
7. G. niger.
8. G. auratus.
9. G. lesueurii.
10. G. jozo.
11. G. flavus.
12. G. nudiceps.
13. G. genivittatus.
14. G. oligolepis.

              ** Head as broad as long, p. 14.
                15. G. buccatus.

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45. Gobionellus hastatus, *Girard in Proc. Acad. Nat. Sc. Philad.* 1858, p. 169. —Coast of Texas.
46. Taiasica, *Marcgr.* p. 144.—Gobius brasiliensis, *Bl. Schn.* p. 69; *Cuv. & Val.* xii. p. 121 (not *Licht.*).—South America.

Species of which the affinity is not determinable.

47 Gobius rubro-tæniatus, *Liénard, Dix. Rapp. Soc. Hist. Nat. Maur.* p. 39.—Mauritius.
48. —— niger, *Lacép.* ii. p. 568.—Gobius commersonii, *Cuv. & Val.* xii. p. 136. —Ile de France.
49. —— cæruleus, *Lacép.* ii. p. 560; *Cuv. & Val.* xii. p. 137.—Bourbon.
50. —— lyricus, *Girard in Proc. Acad. Nat. Sc. Philad.* 1858, p. 169.—Coast of Texas.
51. —— wurdemanni, *Girard, ibid.*—Coast of Texas.
52. —— catulus, *Girard, l. c.*—Coast of Texas.
53. —— gulosus, *Girard, l. c.*—Coast of Texas.
54. —— anjerensis, *Bleck. Blenn. en Gob.* p. 251. f. 11.—Anjer.
55. —— cobitis, *Pall. Zoogr.* iii. p. 161; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 435.—West coast of the Crimea.
56. —— gutum, *Buch. Ham. Fishes of the Ganges*, p. 50; *Cuv. & Val.* xii. p. 138.—Ganges.—A figure of it (No. 272) exists in the Collection of Drawings of Fishes by Hardwicke (MSS. of the British Museum).
57. —— melanopus, (*Casteln.*) *Bleck. Singapore*, iii. p. 456.—Singapore.
58. —— patella, *Thunb. in Vetensk. Acad. Nya Handl. Stockh.* xiii. 1791, p. 191. tab. 6.—East Indies.
59. —— breviceps, *Blyth in Journ. As. Soc. Beng.* p. 271.—Andaman Islands.

ββ. The second dorsal with eleven or less rays.

* Head as broad as long, p. 14.

16. G. cyclopterus.
17. G. lineatus.

** Head longer than broad.

† Præoperculum with two tooth-like prominences, p. 15.

18. G. oplopomus.

†† Præoperculum not armed.

§ Anterior dorsal with six spines, p. 15.

19. G. martensii.
20. G. quagga.
21. G. panizzæ.
22. G. rhodopterus.
23. G. ophthalmoporus.
24. G. obscurus.
25. G. elegans.
26. G. baliurus.
27. G. atherinoides.
28. G. puntangoides (puntang).
29. G. ehrenbergii.
30. G. hemigymnopomus.
31. G. biocellatus.
32. G. lentiginosus.
33. G. ornatus.
34. G. giuris (unicolor).
35. G. viridi-punctatus.
36. G. sublitus.
37. G. albo-punctatus.
38. G. nebulopunctatus.
39. G. soporator.
40. G. nigri.
41. G. nox.
42. G. filosus.
43. G. apogonius.
44. G. sadanundio.
45. G. criniger.
46. G. cocosensis.
47. G. polycynodon.
48. G. reichii.
49. G. sumatranus.
50. G. phaiospilosoma.
51. G. semidoliatus.
52. G. pasuruensis.
53. G. hoevenii.
54. G. tambujon.
55. G. javanicus.
56. G. borneensis.
57. G. melanurus.

§§ Anterior dorsal with five spines.

* Posterior dorsal eight-rayed, p. 34.

58. G. oxypterus.

** Posterior dorsal eleven-rayed, p. 34.

59. G. fasciatus.

β. Head as high as long, p. 34.

60. G. echinocephalus.

bb. Canine teeth.

a. Head as high as long, p. 35.

61. G. amiciensis.

β. Head longer than high.

aa. The first spine of each of the dorsal fins stiff, p. 35.

62. G. bitelatus.
63. G. notacanthus.
64. G. caninoides.

ββ. All the spines and rays flexible, p. 36.

65. G. capistratus.
66. G. ophthalmotænia.
67. G. chinensis.
68. G. caninus.
69. G. venenatus.
70. G. cyanomos.
71. G. chlorostigmatoides.
72. G. frenatus.
73. G. cyanoclavis.
74. G. brevirostris.
75. G. cauerensis.
76. G. bontii.
77. G. phaiomelas.
78. G. xanthosoma (melanosoma).
79. G. baliuroides.
80. G. gymnauchen.
81. G. pleurostigma.
82. G. gastrospilus.
83. G. macrostoma.

b. Caudal fin elongate, pointed, p. 44.

84. G. acutipinnis.
85. G. spectabilis.
86. G. signatus.
87. G. schlegelii.
88. G. polynema.
89. G. margariturus.
90. G. temminckii.
91. G. mystacinus.

B. Scales rather small, fifty or more in a longitudinal series.

1. A tentacle above the orbit, p. 48.

92. G. tentacularis.
93. G. ophthalmonema.

2. No tentacle above the orbit.

a. Caudal fin elongate, pointed, p. 49.

94. G. microlepis.
95. G. papuensis.
96. G. belosso.
97. G. lanceolatus.

b. Caudal fin rounded, not elongate.

aa. Canine teeth none, p. 51.

98. G. marmoratus.
99. G. batrachocephalus.
100. G. stevenii.
101. G. lacteus.
102. G. platyrostris.
103. G. paganellus.
104. G. melanostoma.
105. G. ophiocephalus.
106. G. cruentatus.
107. G. geniporus.
108. G. capito.
109. G. maderensis.
110. G. ekströmii.
111. G. minutus.
112. G. colonianus.
113. G. banana.
114. G. æneofuscus.
115. G. mexicanus.
116. G. transandeanus.
117. G. crassilabris.
118. G. ocellaris.
119. G. grammeponius.
120. G. gymnoponius.
121. G. brunneus.
122. G. annularis.
123. G. xanthozona.
124. G. platynotus.

bb. Canine teeth, p. 67.

125. G. sphinx.
126. G. phalæna.
127. G. semicinctus.
128. G. albomaculatus.
129. G. decussatus.
130. G. bynoensis.

C. Scales minute, p. 70.

131. G. cæruleopunctatus.
132. G. cyanotænia.
133. G. niveatus.
134. G. cryptocentrus.
135. G. russus.
136. G. voigtii.
137. G. polyophthalmus.
138. G. knutteli.
139. G. arabicus.
140. G. fontanesii.
141. G. gymnocephalus.

II. The anterior dorsal with seven to nine spines, p. 75.

142. G. petrophilus.
143. G. ruthensparri.
144. G. stigmothonus.
145. G. flavimanus.
146. G. newberrii.
147. G. hexanema.
148. G. ommaturus.
149. G. lepidus.
150. G. hasta.
151. G. stigmatias.
152. G. virgo.

I. The anterior dorsal with five or six spines.

A. Scales large or of moderate size, fifty or less in a longitudinal series.

1. A longitudinal crest on the nape.

1. Gobius cyprinoides.

Gobius cyprinoides, *Pall. Spicileg. Zool.* viii. p. 17. tab. 1. f. 5; *Cuv. & Val.* xii. p. 129.

—— crista galli, *Cuv. & Val.* xii. p. 130; *Guichen. Poiss. in Ramon de la Sagra, Hist. Cuba*, p. 128. pl. 3. f. 3.

B. 5. $D.\ 6 \left| \frac{1}{9} \right.$. $A.\ \frac{1}{8}$. L. lat. 25. Vert. 11/15.

A low longitudinal crest behind the crown of the head. The height of the body equals the length of the head, and is one-fourth of the total. The width of the interorbital space is less than the diameter of the eye, which is one-fourth of the length of the head. Caudal rounded. Yellowish-brown: the first dorsal black, the others greyish; caudal with numerous brownish dots.

Caribbean Sea.

There is no doubt that Pallas described this species, which is very frequently brought to Europe, but he was misinformed with regard to the locality whence it came.

a. Fine specimen. S. Domingo. Purchased of H. Cuming, Esq.
b–f. Adult: skins and stuffed. Jamaica. From Dr. Parnell's Collection.
g–i. Adult.
k. Adult: skeleton.

The *skeleton* does not differ essentially from that of the typical species of the genus (as *G. capito*). The skull is rather compressed; the orbital margin is very elevated, with a simple edge; the bony bridge between the orbits is very narrow, and the low occipital crest arises from it. There are eleven abdominal and fifteen caudal vertebræ, the length of the former portion of the vertebral column being to that of the caudal as 1 : 1·3.

2. No crest on the head.
  a. Caudal fin rounded, not elongate.
    aa. Canine teeth none.
      a. Head longer than high.
        aa. The second dorsal with eleven or more rays.
          * Head longer than broad.

2. Gobius ratan.

Nordm. in Demid. Voy. Russ. Mérid. iii. p. 416, *Poiss.* pl. 11. f. 2.

D. 6 | 19. A. 15.

Scales of moderate size. The height of the body is one-fifth of the total length, the length of the head one-fourth. Snout rather convex, of moderate extent; cleft of the mouth wide, oblique. The eyes are close together and of moderate size. Dorsal fins subcontinuous, the second higher than the first, nearly as high as the body; caudal rounded. Brownish-black, irregularly spotted with lighter: dorsal fins yellow-edged; the second and the caudal blue, finely reticulated with blackish; anal with some darker spots. (*Nordm.*)

Shores of Odessa.

3. Gobius syrman.

Nordm. in Demid. Voy. Russ. Mérid. iii. p. 419. pl. 12. f. 1.

D. 6 | 19. A. 15.

Scales of moderate size. The height of the body is one-fifth of the total length, the length of the head one-fourth. Snout obtuse, convex; cleft of the mouth oblique; eyes rather small. Dorsal fins close together, lower than the body, the posterior being somewhat higher than the anterior; caudal rounded; the ventrals do not reach to the vent. Yellowish-brown, irregularly brown-spotted; a brown spot below the eye: the first dorsal yellowish, brown-spotted; all the other fins black. (*Nordm.*)

Shores of Odessa.

4. Gobius semilunaris.

Heckel in Ann. Wien. Mus. 1840, ii. p. 152. tab. 8. f. 5, 6; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 438.

D. 6 | 18. A. 14. L. lat. 34–37.

The height of the body is contained six times in the total length, the length of the head four times and a half. Snout of moderate extent, conical, with the jaws equal anteriorly; gape narrow, extending to below the nostrils. Eyes very close together, as long as the snout. The dorsal fins are somewhat remote from each other; the second is as high as the body, and twice as high as the first: caudal subtruncated: the ventrals extend on to the anus. Yellowish-brown, spotted with darker; a brownish band on the root of the caudal fin. (*Heck.*)

River Marizza (Roumelia); Rivers of South Russia.

5. Gobius melanio.

Pall. Zoogr. iii. p. 412; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 412, *Poiss.* pl. 11. f. 1.

D. 6 | 15. A. 14.

Scales of moderate size. The height of the body is contained four times and two-thirds in the total length, the length of the head four times and a quarter. The snout is obtuse, convex; the cleft of the mouth oblique; eye of moderate size. Dorsal fins close together, lower than the body; caudal rounded. Entirely black; the vertical fins yellow-edged. (*Nordm.*)

Shores of Odessa.

6. Gobius sulcatus.

Gobius bothriocephalus, *Eichw. Reise auf dem Kaspischen Meere,* i. p. 279.

—— sulcatus, *Eichw. Zool. Spec.* iii. p. 75, and *Bull. Soc. Nat. Mosc.* 1838, p. 142.

D. 6 | 16. A. 13.

The height of the body is contained five times and a half in the total length, the length of the head three times and three-fourths; the head is broader than high; a transverse groove between the nostrils; the width of the interorbital space equals the diameter of the eye. The pectoral fin extends to the sixth ray of the posterior dorsal, the ventral to the vent; rays of the fins very thick. Yellowish-brown, black-spotted; a large black spot on the first dorsal. (*Eichw.*)

Caspian Sea.

7. **Gobius niger.**

The Black Goby. The Rock-fish.

Gobio niger, *Rondel.* 17. cap. 17. p. 200; *Gesner*, p. 385.

? Gobius niger, *Willughb.* p. 206. tab. N. 12. f. 1; *Ray*, p. 76; *Schonev.* p. 36.

Gobius, no. 1, *Artedi, Genera*, p. 28.

Gobius niger, *L. Syst. Nat.* i. p. 449; *Retz. Faun. Suec.* p. 326; *Müll. Prodr. Zool. Dan.* p. 44; *Nilss. Prodr. Zool. Suec.* p. 93, and *Skand. Faun.* iv. p. 219; *Turton, Brit. Faun.* p. 94; *Low, Faun. Orcad.* p. 205; *Jenyns, Man.* p. 385; *Ekstr. Fische Mörkö*, p. 255, and *Skand. Fisk.* p. 157. tab. 36; *Yarrell, Brit. Fishes*, i. p. 251, 2nd edit. i. p. 281, 3rd edit. ii. p. 318 (part. descript.); *Cuv. & Val.* xii. p. 9; *Parn. Fishes Frith of Forth*, p. 81. pl. 29; *Fries in Wiegm. Arch.* 1840, p. 237; (not *Thomps.*).

—— gozo, *Bl.* tab. 107. f. 3.

? Gobius bicolor, (*Brünn. Ichth. Massil.* p. 30); *L. Gm.* p. 1197; *Bl. Schn.* p. 73 (not *Cuv. & Val.*).

Black Goby, *Penn. Brit. Zool.* iii. p. 186. pl. 38.

Gobius britannicus, *Thomps. Ann. & Mag. Nat. Hist.* 1839, ii. p. 416, and *Proc. Zool. Soc.* 1837, p. 61.

D. $6 \left| \frac{1}{12\text{–}13} \right.$. A. $\frac{1}{11\text{–}12}$. L. lat. 39–40. Vert. 12/16.

Eleven or twelve longitudinal series of scales between the second dorsal and anal fins. The height of the body is contained six times in the total length, the length of the head four times and a half. Dorsal fins close together, about as high as the body; the distance of the dorsal from the eye equals that of the snout from the præoperculum. A few of the upper rays of the pectoral fin sometimes very fine, silk-like; the pectoral extends to the vertical from the anal papilla; the ventral fins reach to the vent. Brownish-olive, more or less distinctly marbled with darker: dorsal and caudal fins with inconspicuous blackish streaks; anal uniform; pectoral with a dark spot on the upper part of its base; ventral greyish.

German Ocean; Atlantic and Mediterranean coasts of Europe.

a, b. Adult. South Devonshire. Museum Leach.
c–h. Fine specimens. Baltic. Presented by Max, Prince of Neuwied.
i. Half-grown. Sicily. Presented by W. Swainson, Esq.
k–m. Half-grown: skins. From Mr. Yarrell's Collection.

Variety: orange-yellow, finely marbled with reddish; fins black on the marginal half: perhaps identical with *Gobius auratus*, Risso.

n. Fine specimen. British coast. From the Collection of the Zoological Society.

8. **Gobius auratus.**

Gobius auratus, *Risso, Ichth. Nice*, p. 160, and *Eur. Mérid.* iii. p. 283; *Cuv. & Val.* xii. p. 31.

Eleotris auratus, *Cuv. Règne Anim.* ii. p. 247.

D. $6 \left| \frac{1}{13\text{–}14} \right.$. A. $\frac{1}{13\text{–}14}$.

The length of the head is one-fourth of the total length, or four times the diameter of the eye. Cheek with seven or eight series of minute warts, radiating from the eye; none on the temple and on the neck. Two or three of the upper pectoral rays slightly detached. Brownish-yellow, marbled with darker; a black spot on the upper part of the root of the pectoral. (*Val.*)

Coast of Nice.

9. **Gobius lesueurii.**

Gobius lesueurii, *Risso, Eur. Mérid.* iii. p. 284; *Cuv. & Val.* xii. p. 33; *Guichen. Exp. Algér. Poiss.* p. 77.

D. 6 $\left|\frac{1}{14}\right.$. A. $\frac{1}{14}$. L. lat. 26–27. L. transv. 4 or 5.

The height of the body is one-seventh of the total length, the length of the head one-fifth. The head is one-third less high than long, and one-quarter less broad than high. The width of the interorbital space is less than one-half the diameter of the eye. The upper profile of the snout descends abruptly, and the lower jaw projects a little. Flesh- or rose-coloured, with yellowish tints: cheek and opercle with three yellow stripes, descending obliquely forwards; the first dorsal with a blackish margin; caudal with two greyish vertical lines. (*Val.*)

Coast of Nice.

10. **Gobius jozo.**

Gobius tertius, *Willughby*, p. 207; *Ray*, p. 76; *Artedi, Synon.* p. 47 (not synon.).

—— jozo, *L. Syst. Nat.* i. p. 450; *Bl. Schn.* p. 69; *Risso, Ichth. Nice*, p. 159, and *Eur. Mérid.* iii. p. 280; *Cuv. & Val.* xii. p. 35; *Guichen. Exp. Algér. Poiss.* p. 77.

—— albescens, &c., *Gronov. Mus.* no. 176, and *Zoophyl.* no. 275.

—— nebulosus, *Risso, Ichth. Nice*, p. 161, and *Eur. Mérid.* iii. p. 281 (not *Forsk.*).

—— longeradiatus, *Risso, Eur. Mérid.* iii. p. 286; *Cuv. & Val.* xii. p. 38.

D. 6 $\left|\frac{1}{12}\right.$. A. $\frac{1}{11}$. L. lat. 34–40.

The height of the body is one-seventh of the total length; head as broad as high, with the snout very obtuse. The eye occupies the second quarter of the length of the head; the width of the interorbital space equals one-half of its diameter. Scales of moderate size; canine teeth none. The dorsal fins are elevated, and some rays of the first are prolonged, filiform; caudal somewhat pointed; the basal membrane of the ventral fin is broad, provided with a small appendage on each side. The upper pectoral rays silk-like. Stripes of minute warts on the side of the head and on the neck. Brownish or brown; fins blackish, especially the ventral and anal fins; the first dorsal black superiorly, or with one or two black spots between the first two spines; dorsal fins sometimes with brownish longitudinal lines.

Mediterranean.

a–b, c. Adult. Dalmatia.

d, e. Adult and half-grown. Bay of Naples. Presented by S. Pratt, Esq.
f. Half-grown: bad state. Malta. From the Haslar Collection.
g. Adult: skeleton. Dalmatia.

11. Gobius flavus.

Cuv. & Val. xii. p. 60.

$$\text{D. } 6 \left| \tfrac{1}{11}. \quad \text{A. } \tfrac{1}{10}. \right.$$

The height of the body is one-sixth of the total length, the length of the head one-fifth. The width of the interorbital space equals the diameter of the eye. The cleft of the mouth is horizontal, and extends to behind the vertical from the orbit. Scales of moderate size. None of the pectoral rays silk-like; no warts on the head. Uniform yellowish. (*Val.*)

Surinam.

12. Gobius nudiceps.

Cuv. & Val. xii. p. 65.

$$\text{D. } 6 \left| \tfrac{1}{11}. \quad \text{A. } \tfrac{1}{10}. \right.$$

The length of the head is one-fourth of the total; it is higher than broad, and half as high as long; its profile descends little, and is nearly straight; the diameter of the eye is one-fifth of the length of the head, and equals the width of the interorbital space. The outer teeth are somewhat enlarged, but there are no canines. Dorsal fins rather low. Scales of moderate size; head, nape of the neck, and base of the pectoral naked. None of the pectoral rays silk-like. Blackish-olive: a black, white-edged vertical band at the base of the pectoral; the first dorsal grey, with three blackish longitudinal streaks, and with the margin yellow; the second with twelve blackish oblique lines; the rays of the caudal dotted with blackish. The other fins uniform grey. (*Val.*)

Cape of Good Hope.

Bleeker ("Cape of Good Hope," p. 25) gives a description of a single specimen of a Goby from the Cape, which he refers to this species. His description differs in several points from that of Valenciennes:—The height of the body is contained six times and a third in the total length, the length of the head four times and three-fifths. The width of the interorbital space is not much more than one-half of the diameter of the eye. *Sixty scales in a longitudinal line*; a narrow stripe of scales across the base of the pectoral fin. The basal half of the pectoral fin deep violet, with a very conspicuous light transverse band; a black spot superiorly at the base.

13. Gobius genivittatus.

Cuv. & Val. xii. p. 64.

$$\text{D. } 6 \left| \tfrac{1}{11}. \quad \text{A. } \tfrac{1}{11}. \right.$$

The upper jaw is somewhat protractile. The length of the head is one-fifth of the total; it is broader than high, and half as high as long. The eye occupies the second quarter of the length of the head;

the profile of the snout descends abruptly. The first dorsal is lower, the second rather higher, than the body. Scales of moderate size. Canine teeth none. Yellowish-brown, with twelve narrow brown vertical streaks; each scale on the sides with a short black stripe; a broad brown band from the eye to the lower margin of the præoperculum. (*Val.*)

Otaheite.

14. **Gobius oligolepis.**

Gobius oligolepis, *Bleek. Sumatra*, iii. p. 508.
—— spilurus, *Bleek. Verh. Bat. Genootsch.* xxii., *Blenn. en Gob.* p. 32.

D. 6 | 11–12. A. 12. L. lat. 22.

The height of the body is contained five times and a half or six times in the total length, the length of the head five times. The head is obtuse, convex, rather higher than broad. The eyes are close together, and their diameter is somewhat less than one-third of the length of the head. Jaws equal anteriorly, the maxillary extending to below the posterior half of the orbit. The teeth of the outer series are enlarged in the upper jaw; canines none; cleft of the mouth slightly oblique. The head and the neck, to the anterior dorsal fin, are naked. The spinous dorsal has the anterior spines produced, and as high as the body; the soft dorsal is lower. The upper pectoral rays silk-like; caudal fin obtusely rounded, nearly one-fourth of the total length. Green: a blackish band between the eye and the interoperculum; head and body spotted with darker, the spots on the sides being transverse and disposed in a series. The soft dorsal fin with two blackish longitudinal lines on the marginal portion; dorsal and caudal rays spotted with violet. (*Bl.*)

Coasts and rivers of Java, Madura, and Sumatra.

** Head as broad as long.

15. **Gobius buccatus.**

Cuv. & Val. xii. p. 60.

D. 6 | $\frac{1}{11}$. A. $\frac{1}{10}$.

Cheeks swollen. Head as broad as long, and one-third broader than high; its length is one-fourth of the total. Mouth nearly vertical. The diameter of the eye is one-sixth of the length of the head, and one-half of the width of the interorbital space. None of the pectoral rays silk-like. Scales of moderate size. Entirely brown. (*Val.*)

Hab. ——?

ββ. The second dorsal with eleven or less rays.

* Head as broad as long.

16. **Gobius cyclopterus.**

Cuv. & Val. xii. p. 59.

D. 6 | $\frac{1}{9}$. A. $\frac{1}{8}$.

The head is as broad as long, and only half as high; its length is one-fourth of the total. Ventral very short and subcircular. Grey, indistinctly marbled with brown. (*Val.*)

New Ireland (Carteret Harbour).

17. Gobius lineatus.

Jenyns, Zool. Beagle, Fishes, p. 95. pl. 19. f. 2.

D. 6 | $\frac{1}{9}$. A. $\frac{1}{8}$. L. lat. 37.

Scales in eleven longitudinal series. The height of the body is contained five times and a half in the total length, the length of the head four times and a half; the head is nearly as broad as long; eyes with a diameter nearly one-fourth that of the head; the interorbital space scarcely more than half a diameter in breadth. Teeth of the outer series enlarged; canine teeth none. The upper pectoral rays are silk-like; ventrals a little shorter than the pectorals; dorsal fins lower than the body; caudal rounded. Sides of the head naked, with stripes of minute warts. Dusky grey, with about ten rather indistinct longitudinal dark lines. Fins dusky, with very faint irregular whitish spots. A dark spot on the upper half of the eye. (*Jen.*)

Chatham Island.

** Head longer than broad.

† Præoperculum with two tooth-like prominences.

18. Gobius oplopomus.

Cuv. & Val. xii. p. 66.

D. 6 | $\frac{1}{9}$. A. $\frac{1}{9}$.

The height of the body equals the length of the head, and is contained four times and a fourth in the total. Canine teeth none. Præoperculum with two tooth-like prominences at the angle. The first dorsal is higher than the body, whilst the second and the anal equal it in height; caudal truncated. Scales large. Greenish above; a series of black spots along the middle of the side. Blue ocellated spots on the cheeks, opercles, and on the back; dorsal fins with purplish spots on their lower half; the basal half of the caudal dotted with black; a blue longitudinal band along the middle of the anal fin; ventral blackish towards the extremity. (*Val.*)

Massuah (Red Sea).

†† Præoperculum not armed.

§ Anterior dorsal with six spines.

19. Gobius martensii.

Gobius fluviatilis, (*Bonelli?*) *Cuv. & Val.* xii. p. 52; *Cuv. Règne Anim. Ill. Poiss.* pl. 80. f. 2; *Martens in Wiegm. Arch.* xxiii. p. 176. tab. 9. f. 4, 5; *Heck. & Kner, Süsswasserf.* p. 57 (not *Pall.*).

D. 6 | $\frac{1}{9}$. A. $\frac{1}{7}$. L. lat. 40.

The height of the body is not quite one-sixth of the total length (without caudal fin), the length of the head one-fourth. The head is as broad as high. Snout rounded, rather obtuse. The dorsal fins are remote from each other and lower than the body. None of the pectoral rays silk-like; the ventral terminates at a great distance from the vent. Greyish, sometimes with ill-defined vertical bands; the second dorsal and the caudal with brown dots on the rays.

Fresh waters of North Italy.

a, b. Fine specimens. Ticino. Presented by Dr. E. Rüppell.

20. **Gobius quagga.**

Heckel, Ann. Wien. Mus. 1840, ii. p. 150. tab. 9. f. 5, 6.

D. 6 | 9–10. A. 9–10. L. lat. 35–37.

The height of the body is contained six times and a half in the total length, the length of the head five times; snout somewhat pointed, with the lower jaw longer than the upper; the eyes are close together, two-sevenths of the length of the head. Dorsal fins rather remote from each other, lower than the body; caudal rounded; the ventral extends on to the vent. Yellowish, with six dark-brown cross-streaks; the first on the mandibula, the second below the eye, the third on the operculum, the fourth, fifth and sixth on the tail; a dark-brown spot on the base of the caudal; vertical fins with waved brownish streaks. (*Heck.*)

Palermo.

21. **Gobius panizzæ.**

Gobius panizzæ, *Verga, Atti della terza Riunione degli Scienziati Ital. Firenze,* 1841, p. 379; *Heck. & Kner, Süsswasserf.* p. 49.

D. 6 | 9. A. 8. L. lat. 35.

The height of the body is contained five times and a half in the total length, the length of the head four times and a half; snout somewhat pointed, with the lower jaw longer than the upper; the width of the interorbital space is less than the diameter of the eye, which occupies the second quarter of the length of the head. Dorsal fins rather remote from each other, lower than the body; caudal rounded; the ventral does not extend on to the vent. Nape of the neck naked; the scales on the tail considerably larger than those on the anterior part of the body. Brownish-olive (in spirits), with a brown longitudinal band; chin black; the first dorsal with a large black spot, the second and the caudal finely brown-dotted.

Lagunes of Comacchio; Lago de Garda.

The characters are taken from two specimens in the Senckenberg Museum, brought by Dr. Rüppell from the Lake of Garda; they are females, only 15 lines long, but with the ovaria fully developed.

22. **Gobius rhodopterus.**

Gobius reticulatus, *Cuv. & Val.* xii. p. 50; *M'Coy in Ann. & Mag. Nat. Hist.* 1841, vi. p. 403 (not *Eichw.*).

D. 6 | 10. A. 10.

The height of the body is one-sixth of the total length, the length of the head one-fourth; snout very short, tumid, convex; lower jaw longer than the upper; eyes large, approximate; first dorsal with the second ray longest, the others gradually decreasing in length; the ventral fin reaches to the anus. Yellowish, reticulated with black lines; dorsal fins of a beautiful rose-colour (during life), with large black spots; the other fins whitish. (*M'Coy.*)

Valenciennes mentions a black spot above the axil of the pectoral fin, another at the root of the caudal, a third below the eye, and two at the extremity of the lower jaw.

Mediterranean; Dublin Bay.

23. Gobius ophthalmoporus.

Bleeker, Amboina, iv. p. 340.

$$\text{D. } 6 \,\Big|\, \tfrac{1}{10}. \quad \text{A. } \tfrac{1}{10}. \quad \text{L. lat. } 45.$$

The height of the body is contained six or seven times in the total length, the length of the head five times and a quarter to five times and three-quarters. The head is higher than broad, its greatest width being nearly one-half of its length. The eye is situated in the anterior half of the head, its diameter being one-fourth of the length of the head; the width of the space between the eyes is about one-half their diameter. The snout is obtuse, as long as the eye; the cleft of the mouth oblique, extending to below the front margin of the orbit. The teeth of the outer series are enlarged; canine teeth none. A large pore behind the eye. The dorsal fins are not elevated; the third spine of the anterior dorsal is the longest; caudal rounded. Head, body, and pectoral fins uniform green; the anterior dorsal with blackish-violet longitudinal streaks, the posterior with series of violet spots; anal with a blackish margin. (*Bleek.*)

Sea of Amboyna.

24. Gobius obscurus.

Peters in Wiegm. Arch. 1855, p. 250.

$$\text{D. } 6 \,\Big|\, \tfrac{1}{9\,(10)}. \quad \text{A. } \tfrac{1}{9\,(10)}. \quad \text{L. lat. } 42.$$

Fourteen longitudinal series of scales between the dorsal and the vent. The length of the head is contained three times and one-fifth in the total (without caudal); it is one-fourth broader than high, and as much longer than broad. The eyes occupy the second quarter of the length of the head, and are distant from each other the entire or the half length of their diameter. The snout is somewhat convex; the cleft of the mouth slightly oblique, and extending to below the anterior margin of the orbit; it does not ascend to the level of the eye. Teeth of the outer series enlarged. The first dorsal lower than the body; caudal rounded; the upper pectoral rays silk-like. Head naked. Blackish-brown; dorsal and caudal fins with darker spots. (*Pet.*)

Mozambique.

25. Gobius elegans.

Gobius elegans, (*Kuhl & van Hass.*) *Cuv. & Val.* xii. p. 58; ? *Bleeker, Natuurk. Tydschr. Nederl. Ind.* 1851, i. fig. 10.
—— elegans, var., *Cantor, Catal.* p. 179.

D. $6 \mid \frac{1}{10}$. A. $\frac{1}{9}$. L. lat. 36.

Nine longitudinal series of scales between the second dorsal and the anal fins. The height of the body is one-sixth of the total length, the length of the head one-fifth. Snout obtuse. The anterior dorsal fin is rather lower than the posterior, the height of which equals that of the body. The upper rays of the pectoral fin silk-like. Caudal rounded. Teeth small, equal in size. Buff-coloured, minutely dotted with brown; the upper half of the sides with three or four indistinct lines, each formed by a series of very short brown streaks, beneath which a series of indistinct brown spots; a blackish spot at the posterior margin of the orbit, a second at the upper part of the root of the pectoral fin, and a third at the lower part of the root, spreading on the gill-menbrane. The membranes of the dorsal fins with three or four indistinct series of blackish spots, and a few similar on the caudal membrane.

Seas of Pinang, Bombay, Java, New Guinea, and Vanicolo.

a. Skin. Sea of Pinang. From Dr. Cantor's Collection.—Nearly uniform yellowish. The description of the colours has been borrowed from Cantor's description, which was drawn up from this specimen.

26. Gobius baliurus.

Gobius baliurus, *Cuv. & Val.* xii. p. 61; *Bleek. Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* p. 31.

D. $6 \mid \frac{1}{10}$. A. $\frac{1}{9}$.

The height of the body is one-sixth of the total length, the length of the head one-fourth. The head is half as high and broad as long. The eye is one-fourth of the length of the head; interorbital space very narrow. Teeth small; canine teeth none. Scales large. None of the pectoral rays silk-like; three or four series of minute warts below the eye. Caudal rounded. Brownish-grey, indistinctly marbled with greyish. Caudal fin with a round brown spot at the base, and with white points on the rays. Ventral and margin of the anal white. (*Val.*)

Seas of Java, Amboyna, and Celebes.

? *a*. Adult. Amboyna. Purchased of Mr. Frank.

27. Gobius atherinoides.

Peters in Wiegm. Arch. 1855, p. 254.

D. $6 \mid \frac{1}{10}$. A. $\frac{1}{10}$. L. lat. 26–28.

Scales in nine longitudinal series. The height of the body is contained five times and a half in the total length (without caudal), the length of the head three times and three-quarters. Snout shorter than the eye, convex; cleft of the mouth oblique; the eyes are very close together, and their diameter is rather more than one-fourth of the length of the head. Teeth of the outer series enlarged. Dorsal fins not elevated; none of the upper pectoral rays silk-like. Greenish; irregular brown spots along the side of the head and body, the last on the base of the caudal fin. Dorsal and caudal fins brown-spotted. (*Pet.*)

Mozambique.

28. **Gobius puntangoides.**

Gobius puntang, *Bleek. Natuurk. Tydschr. Nederl. Ind.* iii. p. 692 (not ii. p. 486).

—— puntangoides, *Bleek. Ceram,* iii. p. 242.

D. $6 \mid \frac{1}{10}$. A. $\frac{1}{9}$. L. lat. 28.

The height of the body is contained five times and a half or five times in the total length, the length of the head five times; the head is higher than broad, its height being three-fourths or four-fifths of its length; the eyes are close together, and their diameter is one-fourth or one-fifth of the length of the head. Sides of the head scaly; snout obtuse, convex, longer than the eye; the cleft of the mouth is oblique, with the jaws equal anteriorly. Teeth of the outer series enlarged; canine teeth none. Dorsal fins as high as, or somewhat higher than, the body; caudal rounded. Olive, with brownish cross-bands; most of the scales have a greenish dot. Dorsal, pectoral, and caudal fins with series of yellow and blackish dots; anal with alternate yellow and reddish-violet longitudinal streaks.

Rivers and coasts of the East Indian Archipelago.

a. Fine specimen. Amboyna. Purchased of Mr. Frank.
b. Half-grown. Ceram. Purchased of Mr. Stevens.

Gobius puntang, Bleek. Riouw, p. 486, appears to be very closely allied to this species.

29. **Gobius ehrenbergii.**

Cuv. & Val. xii. p. 63.

D. $6 \mid \frac{1}{10}$. A. $\frac{1}{9}$.

The length of the head is one-fifth of the total; it is nearly as broad as high, and one-third longer than broad. The eye occupies the second quarter of the length of the head. Scales large. Teeth very small. The rays of the second dorsal fin become gradually longer posteriorly, and the last are one-third higher than the body; the upper pectoral rays are somewhat silk-like. Blackish, dotted with blue; dorsal fins with five or six black longitudinal lines; rays of the caudal dotted with black. (*Val.*)

Alexandria.

30. Gobius hemigymnopomus.

Bleeker, Act. Soc. Sc. Indo-Nederl. i., *Manado en Makassar,* p. 50.

D. $6 \left| \frac{1}{10} \right.$. A. $\frac{1}{8}$. L. lat. 32.

The height of the body is contained five times and a half in the total length, the length of the head four times and a half; the head is as broad as high; the snout obtuse, convex, shorter than the eye, with the jaws nearly equal anteriorly. The eyes are very close together, and the length of their diameter is contained three times and a half in that of the head. The teeth of the outer series are enlarged. The upper part of the sides of the head scaly, the lower naked. Dorsal fins half as high as the body; the upper pectoral rays silk-like; caudal rounded. Greenish, spotted with brown; two brown longitudinal streaks on the side of the head; an irregular longitudinal band on the side of the body; dorsal and anal fins with two series of round black spots. (*Bleek.*)

Seas of Macassar and Biliton.

31. Gobius biocellatus.

Cuv. & Val. xii. p. 73.

D. $6 \left| \frac{1}{10} \right.$. A. $\frac{1}{9}$.

Snout elongate, depressed. Head broader than high. Canine teeth none. The height of the body is one-seventh of the total length. Greyish-brown, with brown stripes along the series of scales; five or six clouded spots on the sides; the first dorsal with two black, white-edged spots—one between the first and second spines, the other between the fifth and sixth; anal brownish, with white spots; caudal dotted with brown. (*Val.*)

Pondicherry.

32. Gobius lentiginosus.

Richards. Ichth. Voy. Ereb. & Terr. p. 3. pl. 1. figs. 5, 6.

D. $6 \left| \frac{1}{10} \right.$. A. $\frac{1}{9}$. L. lat. 26.

Six longitudinal series of scales between the second dorsal and the anal fin. The head is about as high as broad. Eyes very close together, of moderate size; snout moderately long, with the lower jaw prominent. Head naked. Teeth small. The anterior dorsal is rather lower than the posterior, which is as high as the body. Caudal slightly rounded; none of the pectoral rays silk-like. Honey-yellow, marbled and spotted with blackish-brown and dotted with white; a dark spot at the root of the caudal fin; dorsal and caudal fins dotted with black; anal and ventrals immaculate.

Bay of Islands, New Zealand.

a. Bay of Islands. Presented by Lieut. A. Smith.
b, c. Not good state. Bay of Islands. Presented by the Lords of the Admiralty.—Types of the species.

33. Gobius ornatus.

Gobius ornatus, *Rüpp. Atl. Fische*, p. 135, and *N. W. Fische*, p. 137.
—— ventralis, (*Ehrenb.*) *Cuv. & Val.* xii. p. 113.
—— interstinctus, *Richards. Voy. Ereb. & Terr. Fishes*, p. 3. pl. 5. figs. 3–6; *Bleek. Amb. & Ceram*, p. 275.
—— periophthalmoides, *Bleek. Natuurk. Tydschr. Nederl. Ind.* 1851, i. p. 249.

$$\text{D. } 6 \left| \frac{1}{10\text{–}11}. \quad \text{A. } \frac{1}{8\text{–}9}. \quad \text{L. lat. } 26. \right.$$

Seven longitudinal series of scales between the second dorsal and the anal fin. The height of the body is contained six or seven times in the total length, the length of the head four times and a half; the head is rather broader than high, its width being contained one and a half times in its length. The eyes are very close together; their diameter is three times and a half in the length of the head. Snout obtuse, convex, as long as the eye. Crown of the head scaly. The cleft of the mouth is scarcely oblique, with the jaws nearly equal in length. All the teeth very small. Dorsal fins somewhat lower than the body; caudal rounded; the upper rays of the pectoral silk-like. Green, with numerous brown spots and yellow dots; all the fins, except the ventral, dotted with black.

Red Sea; East Indian Archipelago; Philippine Islands; North-west coast of Australia.

a. Fine specimen. Red Sea. Collected and presented by Dr. E. Rüppell.
b. Half-grown. Amboyna. Purchased of Mr. Frank.
c. Adult. Moluccas.
d. Fine specimen. Philippine Islands.
e–f. Adult. Feejee Islands. Voyage of the 'Herald.'
g. Half-grown: bad state.
h–k. Half-grown: not good state. } North-west coast of Australia. From the Haslar Collection.—Types of *G. interstinctus*.
l. Adult. Presented by Sir J. Richardson.

34. Gobius giuris.

Korah-motta, *Russell*, pl. 50.
Koku, *Russell*, pl. 51.
Bullee korah, *Russell*, pl. 53.
Gobius giuris, *Buch. Ham. Fish. Gang.* p. 51. pl. 33. fig. 15; *Cuv. & Val.* xii. p. 72; *Bleek. Verh. Bat. Gen.* xii., *Blenn. en Gob.* p. 24.
—— kokius, *Cuv. & Val.* xii. p. 68; *Jerdon in Madr. Journ.* xv. p. 148; *Bleek. l. c.*, *Cant. Catal.* p. 180; *Jacq. Voy. Ind. Poiss.* pl. 14. fig. 3.
—— russelii, *Cuv. & Val.* xii. p. 75.
—— catebus, *Cuv. & Val.* xii. p. 76.
—— kora, *Cuv. & Val.* xii. p. 77.
—— celebicus, *Cuv. & Val.* xii. p. 74; *Bleek. Banten*, p. 318.
—— kurpah, *Sykes in Trans. Zool. Soc.* ii. p. 352. pl. 61. fig. 1.
—— platycephalus, *Peters, Monatsber. Berl. Acad.* 1852, p. 681.
—— phaiosoma, *Bleek. Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* p. 30, and *Natuurk. Tydschr. Nederl. Ind.* 1851, i. fig. 5.

Gobius fusiformis, *Bleeker, Verhand. Batav. Genootsch. l. c.*
—— fasciato-punctatus, *Richards. Voy. Sulph. Ichth.* p. 145. pl. 62. figs. 13, 14.

B. 4. D. 6 $\frac{}{9}$. A. $\frac{1}{8}$. L. lat. 30–33. Vert. 11/16.

Nine or ten longitudinal series of scales between the second dorsal and the anal fins. Snout elongate, depressed, with the lower jaw prominent; head broader than high; the teeth of the outer series enlarged, canine teeth none. The scales on the neck are much smaller than those on the sides of the body. The height of the body is one-sixth or one-seventh of the total length, the length of the head one-fourth. The interorbital space is flat, of moderate width, broader in large, and narrower in immature specimens. Dorsal fins nearly as high as the body; the spines of the anterior dorsal sometimes a little prolonged in adult specimens. The distance of the first dorsal from the eye nearly equals that of the snout from the præoperculum. No silk-like pectoral rays; the ventral extends nearly on to the vent. Yellowish-brown, with more or less distinct brown bands across the back, alternating with a series of rounded brown blotches situated along the sides of the body. Pectoral, dorsal, and caudal fins with series of brown dots, the former with a small brownish spot on the upper part of the base; generally a brown cross-streak between the eyes.

Found on all the East Indian coasts; entering fresh waters.

a, b, c. Adult. Ceylon.
d–h, i, k. Half-grown. Madras. Presented by T. C. Jerdon, Esq.
l. Fourteen inches long: stuffed. Calcutta. From the Collection of the East India Company.
m. Adult. Calcutta. From the Collection of Messrs. von Schlagintweit.
n–p. Young. Bengal. From the Collection of the East India Company.
q. Adult: skin. Fresh waters of Pinang. From Dr. Cantor's Collection.
r. Adult: skin. Sea of Pinang. From Dr. Cantor's Collection.
s, t. Fine specimens. Siam. From M. Mouhot's Collection.
u. Large specimen. Amboyna. Purchased of Mr. Frank.
v. Adult. Ceram. From the Collection of Madame Ida Pfeiffer.
w. Half-grown. Ceram. Purchased of Mr. Steven.
x. Adult. Borneo. Purchased of Mr. Frank.
y. Fine specimen. Philippine Islands.
z. Adult. China Seas. Presented by Captain Sir E. Belcher.
α. Adult. China Seas. Presented by J. R. Reeves, Esq.—Type of *G. fasciato-punctatus.*
β, γ–δ, ε–θ, ι, κ, λ. Adult and half-grown. China.
μ, ν, ξ, ο, π, ρ. Adult, half-grown, and young. East Indies.
σ. Young. Zambeze. From Prof. Peters's Collection as *Gobius platycephalus*, Peters.
τ. Adult male: skeleton. From the Collection of the Zoological Society.

As in all species that are very numerous in individuals (*Rana temporaria*, *Serranus scriba* and *cabrilla*, &c.), so in the present, the accidental and individual varieties are innumerable, and sometimes so striking, that one is tempted to consider them as specific differences. In order to arrive at the truth, it is necessary to examine a great number of specimens, when we soon discover that none of the characters on which *G. celebicus*, *fasciato-punctatus*, &c. have been founded, hold good. The specimen, however, found by Kuhl and van Hasselt in Java, which has been named by them *G. unicolor* (not Cuv. & Val.), and which is still preserved in the Leyden Museum, may well prove to be a distinct species. It has a shorter snout than any of the thirty-seven specimens in the British Museum, the scales on the neck are not much smaller than those on the sides, and the colours appear to have been uniform.

Skeleton.—All the bones of the head are somewhat prolonged, in accordance with the elongate external form of the fish. The crown of the skull is rather flat, slightly elevated along its median line, which terminates in a low occipital crest. The lateral and anterior margins of the crown (parietal and principal frontal bones) are provided with a double ridge, including a muciferous channel; the outer anterior angle of the crown is a point projecting into the orbit. The orbit is on the upper surface of the head, and not closed by an infraorbital ring. The orbital portion of the frontals is very narrow. The præfrontal is well developed, and forms an anterior projecting angle of the orbit; only a part of the ethmoid is covered by the frontal. The bones of the jaws are prolonged, but strong: the intermaxillary has no dilated lamella posteriorly; the maxillary is styliform, slightly curved; both bones have the sides by which they touch each other so grooved, that they exactly fit on each other; the mouth not being much protractile, these bones cannot be removed far from one another. The dentary bone of the lower jaw is strong, similar to the furcula of a bird; the articular bone is horizontally dilated, extending only to a short distance beyond the point of its union with the dentary; the angular bone is very small. The tympanic bones are narrow, large portions of the tympanic groove being unossified: the hypotympanic is formed by two portions, the upper for the sutures with the pterygoid and mesotympanic, the lower for the suture with the præoperculum. There is a wide free space between these two portions, posteriorly closed by the mesotympanic and præoperculum; the pretympanic is very narrow, and considerably smaller than the mesotympanic. The glosso-hyal is extremely broad, triangular, the point of the triangle being posterior. The humeral arch is fixed to the skull by the suprascapula, which is formed by two styliform processes, the lower of which is extremely slender. There is a transverse groove formed by two ridges near the point where these two processes meet; it serves as the passage for the muciferous channels of the head into that of the lateral line. The humerus has a short process posteriorly for articulation with the pubic bone of its side; radius very short. Each pubic is a simple, styliform, concave bone attached to the humeral process above mentioned by an intermediate cartilage.

The posterior portion of the occipital bone is produced, tubiform. There are eleven abdominal and sixteen caudal vertebræ, the length of the former portion of the vertebral column being to that of the caudal as 1 : 1·24. Ribs and processes of the vertebræ feeble.

The peculiarities of the skeleton of the typical species of *Gobius* appear to consist—

1. In the flat and broad form of the crown of the head, together with a very narrow orbital portion of the frontal bones.
2. In the form of the different pieces of the lower jaw.
3. In the incomplete ossification of the infraorbitals and of the tympanic bones, there being a large free space in the tympanic groove.
4. In the articulation of the pubic bones with the humerus.
5. In the broad glosso-hyal.
6. In the comparatively small number of vertebræ.

35. **Gobius viridi-punctatus.**

Nuna Motta, *Russell*, i. p. 41. pl. 52.
Gobius viridi-punctatus, *Cuv. & Val.* xii. p. 62.

$$\mathrm{D.}\ 6 \left|\ \frac{1}{10}.\quad \mathrm{A.}\ \frac{1}{9}.\right.$$

The height of the body is one-sixth of the total length, the length of the head one-fourth. The head is half as high and broad as long. The eye is one-fourth of the length of the head; interorbital space very narrow. Lateral teeth slightly enlarged, canine-like. Scales large; those on the neck small. None of the pectoral rays silk-like; two series of minute warts on the cheek. Yellowish-brown, with paler dots on the sides; a series of four or five deep-brown spots along the sides; dorsal with a brown longitudinal streak in its upper third; ventral and anal blackish. (*Val.*)

Coast of Coromandel; Bombay.

36. **Gobius sublitus.**

Cant. Catal. p. 181.

$$\mathrm{D.}\ 6 \left|\ \frac{1}{9}.\quad \mathrm{A.}\ \frac{1}{8}.\quad \mathrm{L.\ lat.}\ 38.\right.$$

The height of the body is contained six times and a half in the total length, the length of the head four times; the head is rather elongate, higher than broad, its depth being one-third of its length; snout rather pointed; the eyes are very close together, and occupy the second quarter of the length of the head; cleft of the mouth wide, oblique; teeth card-like. The four anterior dorsal spines are nearly equal in height; the fifth is somewhat produced; the second dorsal as high as the body; caudal a little pointed; none of the pectoral rays silk-like. Brownish-grey, with six parallel brownish longitudinal streaks; anterior dorsal with a central whitish curved band, and a similar one along the base; second dorsal and caudal with series of whitish spots; anal with a subterminal reddish-white band; the posterior pointed part of this fin, as well as the outer half of the ventrals and pectorals, blackish.

Sea of Pinang.

a. Type of the species: skin: not good state. From Dr. Cantor's Collection.

37. **Gobius albo-punctatus.**

Gobius albo-punctatus, *Cuv. & Val.* xii. p. 57.
—— padangensis, *Bleek. Blenn. en Gob.* p. 249.
—— nebulo-punctatus, *Rüpp. N. W. Fische,* p. 139.
—— punctillatus, *Rüpp. Atl. Fische,* p. 138, and *N. W. Fische,* p. 138.

$\text{D. } 6 \,\big|\, \frac{1}{9}.\quad \text{A. } \frac{1}{8}.\quad \text{L. lat. } 35.$

Ten longitudinal series of scales between the second dorsal and the anal fins. Head broader than high; canine teeth none. The height of the body is contained five times and a half in the total length, the length of the head four times and a third. Snout somewhat longer than the diameter of the eye; interorbital space narrow. Dorsal fins not very close together; the anterior lower than the posterior, which is nearly as high as the body. The distance of the first dorsal from the eye equals that of the snout from the præoperculum. Upper pectoral rays silk-like; the ventral has the basal membrane well developed, and does not extend on to the vent. Scales on the nape of the neck smaller than those on the side of the body. Reddish-brown (in spirits), marbled with darker; sides of the head and body dotted with silvery, the dots forming series along the rows of the scales. Dorsal and caudal fins greyish, dotted with black, the dots forming three series on the anterior dorsal and two on the posterior; the other fins uniform greyish.

Red Sea; Indian Ocean; Feejee Islands; Port Essington.

a. Adult. Egypt. Presented by J. Burton, Esq.
b, c–e. Adult and half-grown. China. Presented by Captain Sir E. Belcher, C.B.
f–g, h–k. Fine specimens. Feejee Islands. Voyage of the 'Herald.'
l, m. Half-grown and young: not good state. Port Essington. From the Haslar Collection.
n–q. Young. From the Collection of the Zoological Society.
r. Adult.

Variety: L. lat. 37–40. Dorsal, caudal, and pectoral fins blackish, with series of whitish dots.

a. Adult. Voyage of H.M.S. Chanticleer.
b. Adult. From the Haslar Collection.

G. nebulo-punctatus, Rüpp., is identical with *G. albo-punctatus,* Cuv. & Val., as I have convinced myself by examination of the typical specimen in the Senckenberg Museum. *G. punctillatus,* Rüpp., is the same species.

38. Gobius nebulo-punctatus.

Gobius nebulo-punctatus, *Cuv. & Val.* xii. p. 58; *Peters in Wiegm. Arch.* 1855, p. 250.
? Gobius nebulo-punctatus, *Bleek. Act. Soc. Sc. Indo-Nederl.* iii., *Sumatra,* p. 40.
Gobius fuscus, *Rüpp. Atl. Fische,* p. 137.

$$D.\ 6 \left| \frac{1}{9}. \right. \quad A.\ \frac{1}{8}. \quad L.\ lat.\ 35.$$

The height of the body is contained six times in the total length, the length of the head four times and two-thirds. The head is nearly as broad as high, its height being more than one-half of its length. The diameter of the eye is one-fourth of the length of the head; it is situated entirely in the anterior half of the head; interorbital space very narrow. Snout as long as the eye, with the cleft of the mouth oblique, and with the jaws equal in length. The teeth in the jaws form a band, those of the outer series being somewhat enlarged. Dorsal fins separated from each other, but close together; the first is lower than the second, the height of which equals that of the body. The upper pectoral rays silk-like; caudal rounded; the anal is much higher posteriorly than anteriorly, its height being equal to that of the second dorsal fin. Greenish, clouded with brownish; head and body with longitudinal series of numerous white dots; fins uniform blackish, the first dorsal edged with white superiorly.

Red Sea; Mozambique. ? Trussan (West Sumatra).

Dr. Rüppell considers his *G. fuscus*, the typical specimen of which is lost, as identical with *G. nebulo-punctatus*, Cuv. & Val. If Bleeker's specimens really belong to the same species, they are immature, with larger eyes and with shorter snout than in the adult fish.

This fish, however, appears to be only a variety of *G. albopunctatus.* The following specimens may be considered as typical, as they are from the original Collection of Prof. Ehrenberg.

a–b. Red Sea. From the Berlin Museum.

39. Gobius soporator.

Cuv. & Val. xii. p. 56; *Guichen. Poiss. in Ramon de la Sagra, Hist. Cuba,* p. 127.

$$D.\ 6 \left| \frac{1}{9}. \right. \quad A.\ \frac{1}{8}. \quad L.\ lat.\ 35\text{–}41.$$

Twelve longitudinal series of scales between the second dorsal and the anal fins. Head rather broader than high; the height of the body is contained five times to four times and a half in the total length, the length of the head four times. The snout is rather longer than the diameter of the eye, which equals the width of the interorbital space. Scales on the neck much smaller than those on the body. Dorsal fins not very close together, lower than the body; the distance of the first dorsal from the eye equals that of the snout from the præoperculum. The upper rays of the pectoral silk-like; the ventral fin has the basal membrane very broad, and terminates at some distance from the vent; no warty stripes on the head; cheeks naked. Dark brownish-olive, marbled with darker, and with lighter dots along the series of scales; ventrals blackish.

Caribbean Sea; Gulf of Mexico; Mediterranean.

a. Adult: not good state. Jamaica.
b. Adult: skin. From Dr. Parnell's Collection.
c. Half-grown. Mexico. From M. Sallé's Collection.
d–e, f–g. Panama.
h–i. Fine specimens. Sicily. Collected by W. Swainson, Esq.
k, l. Adult. From the Collection of the Zoological Society.
m. Half-grown: stuffed.
n. Half-grown. Caribbean Sea. From the Collection of the Zoological Society.

Professor Peters has kindly communicated to me a description of the unique specimen in the Berlin Museum, on which Müller and Troschel have founded their *Gobius bishopi* (in Schomburgk's Barbad. p. 672). It so closely agrees with our specimens of *G. soporator*, that I have no doubt that both are identical.

40. **Gobius nigri.**

D. 6 | 11. A. 9. L. lat. 42.

Fifteen longitudinal series of scales between the second dorsal fin and the anal. The height of the body is contained four times and two-thirds in the total length, the length of the head four times; the head is broader than high, its width being five-sixths of its length; the snout broad and depressed, as long as the diameter of the eye; the cleft of the mouth horizontal, with the jaws equal anteriorly; the maxillary extends somewhat beyond the anterior margin of the eye. The eyes are close together, directed upwards, their diameter being one-fourth of the length of the head. The head is densely covered with small scales to the vertical from the centre of the eye. Canine teeth none; teeth of the outer series somewhat enlarged. Dorsal fins separated from each other, of nearly equal height, lower than the body; caudal obtusely rounded; pectoral with the basal portion scaly, and with the upper rays silk-like; ventral subcircular, not extending on to the vent, with the basal membrane well developed and provided with two processes. Scales ctenoid. Chestnut-brown: dorsal, caudal, and pectoral brown-spotted; anal and ventral blackish.

a. Fine specimen. Niger Expedition. From Mr. Fraser's Collection.

	lines.
Total length	30
Height of the body	6½
Length of the head	8
Greatest width of the head	6½
Diameter of the eye	2

41. Gobius nox.

Bleeker, Blenn. en Gob. p. 248.

$$\mathrm{D.}\ 6 \,\Big|\, \tfrac{1}{9}.\quad \mathrm{A.}\ \tfrac{1}{8}.\quad \mathrm{L.\ lat.}\ 30.$$

The height of the body is contained five times and a half or six times in the total length, the length of the head four times to four times and a half; the head is a little broader than high; the diameter of the eye is contained three times or three times and a half in the length of the head; the width of the interorbital space less than one-half the diameter of the eye. The cleft of the mouth is oblique, with the jaws equal anteriorly; teeth of the outer series enlarged; canine teeth none. Dorsal fins lower than the body; the upper pectoral rays silk-like; caudal rounded. Entirely deep brown or black. (*Bleek.*)

Coasts of West Sumatra, Nias, and Solor.

42. Gobius filosus.

Cuv. & Val. xii. p. 78.

$$\mathrm{D.}\ 6 \,\Big|\, \tfrac{1}{9}.\quad \mathrm{A.}\ \tfrac{1}{8}.$$

The height and the width of the body at the pectoral fins are one-sixth of the total length, the length of the head nearly one-fourth. The head is one-fourth less broad, and one-half less high, than long; the snout is depressed, obtuse, with the lower jaw prominent. The eyes are on the upper surface of the head; their diameter equals the width of the interorbital space, and is one-sixth of the length of the head. Canine teeth none; the teeth of the outer series very slightly enlarged. The second dorsal spine filiform, sometimes twice as high as the body; caudal somewhat pointed; the upper pectoral rays are silk-like; the basal membrane of the ventral well developed. Yellowish-brown, irregularly spotted with darker: dorsal fins with longitudinal series of brown dots, the caudal with cross-series on the middle rays; anal with the margin white. (*Val.*)

Ile de France.

43. Gobius apogonius.

Cant. Catal. p. 182.

$$\mathrm{D.}\ 6 \,\Big|\, \tfrac{1}{7}.\quad \mathrm{A.}\ \tfrac{1}{8}.\quad \mathrm{L.\ lat.}\ 25.$$

Ten longitudinal series of scales between the second dorsal and the anal. The height of the body is two-sevenths of the total length, the length of the head one-fourth; the head is depressed, with the muzzle broad and rounded; the diameter of the eye is one-fourth of the length of the head, and equals the width of the interorbital space. The cleft of the mouth is oblique, with the lower jaw slightly projecting beyond the upper. Canine teeth none. The middle rays of the anterior dorsal prolonged, as high as, or higher than, the body; caudal rounded; the upper rays of the pectoral silk-like. Buff-coloured, with several, sometimes interrupted, black spots; on the anterior dorsal two elongated black spots, of which the posterior between the fourth and fifth spines; the other vertical fins with series of black dots and with the margin free; ventrals with the extremities of the two central rays black.

Sea of Pinang.

a, b. Types of the species: skins. From Dr. Cantor's Collection.

44. Gobius sadanundio.

Buch. Ham. Fish. Gang. pp. 52, 366; *Bleek. Verh. Batav. Genootsch.* xxv., *Bengal en Hindost.* p. 102. tab. 2. fig. 2.

D. $6 \mid \frac{1}{7}$. A. $\frac{1}{7}$. L. lat. 26.

The height of the body is contained four times and a half or five times in the total length, the length of the head four times and a third or four times and a half. The head is nearly as broad as high. The diameter of the eye is less than the width of the interorbital space, and one-third of the length of the head. Snout and cheeks naked. The cleft of the mouth extends to below the middle of the eye; teeth in villiform bands, canines none. The dorsal fins nearly as high as the body, the middle spines of the anterior one being produced into short filaments. Green, with scattered black dots on the sides; the anterior dorsal yellowish, with a blackish blotch posteriorly; the second dorsal and the anal with one or three longitudinal series of black dots; caudal with two or four blackish spots on the base. (*Bl.*)

River Hooghly (Calcutta).

45. Gobius criniger.

? Gobius nebulosus, *Forsk.* p. 24; *Bl. Schn.* p. 72; *Cuv. & Val.* xii. p. 84.
Gobius criniger, *Cuv. & Val.* xii. p. 82; *Cant. Catal.* p. 184; *Bleeker, Banka*, p. 453; *Richards. Ichth. Voy. Ereb. & Terr.* p. 2. pl. 1. figs. 3, 4.

B. 5. D. $6 \mid \frac{1}{9}$. A. $\frac{1}{9}$. L. lat. 34.

Nine longitudinal series of scales between the second dorsal and the anal fins. The height of the body is one-sixth of the total length, the length of the head one-fourth; the latter is nearly half as high as long, and a quarter less broad than high. The eye occupies the second quarter of the length of the head; the width of the interorbital space is one-half of the diameter of the eye. Snout short; teeth small. The head and the neck are naked. The dorsal fins are equal in height, as high as the body; the second spine of the first dorsal sometimes produced, filiform; caudal rounded; none of the pectoral rays silk-like. Pale ochreous: head, body, dorsal and caudal fins irregularly spotted with black, some of the spots being very large; caudal and anal fins with black margins.

North-west coast of Australia; New Guinea; East Indian Archipelago; Pinang; Malabar.

a–d. Adult. Madras. Presented by T. C. Jerdon, Esq.

e. Skin. Sea of Pinang. From Dr. Cantor's Collection.—Type of Dr. Cantor's description.

f. Adult: very bad state. N.W. coast of Australia.—Type of Sir J. Richardson's description.—The tooth described as the canine tooth is very small.

g. Adult: bad state. Port Essington.

46. **Gobius cocosensis.**

Bleeker, Kokos-eiland. p. 47.

D. 6 | $\frac{1}{9}$. A. $\frac{1}{8}$. L. lat. 34.

The height of the body is contained six times in the total length, the length of the head five times and a quarter. The head is nearly as broad as high; the snout obtuse, convex. The eyes are close together, and their diameter is one-third of the length of the head. Cleft of the mouth oblique; teeth of the outer series enlarged; canine teeth none. Head and nape of the neck naked. Dorsal fins lower than the body; caudal rounded; the upper pectoral rays silk-like. Greenish, clouded with brownish; head with blue dots; the rays of the soft dorsal and of the caudal brown-spotted; the other fins immaculate. (*Bleek.*)

Sea of New Selma.

47. **Gobius polycynodon.**

Bleeker, Verhand. Batav. Genootsch. xxii., *Blenn. en Gob.* p. 25.

D. 6 | $\frac{1}{9}$. A. $\frac{1}{9}$. L. lat. 25.

The height of the body is one-ninth of the total length, the length of the head one-sixth; the head is obtuse, flat, with the upper profile nearly straight, broader than high. The width of the interorbital space equals the diameter of the eye, which is contained three times and a half in the length of the head. Teeth of the outer series enlarged. The first dorsal is higher than the body; caudal obtuse, of the length of the head. Entirely uniform green. (*Bleek.*)

Coast of Pasuruan.

48. **Gobius reichii.**

Bleeker, Sumatra, iii. p. 509.

D. 6 | $\frac{1}{8}$. A. $\frac{1}{8}$. L. lat. 26.

The height of the body is contained six times in the total length, the length of the head four times and three-fifths; the height and the width of the head are nearly equal to each other, and two-thirds of the length of the head. The eyes are very close together, one-third of the length of the head. Snout obtuse, convex, with the upper jaw scarcely shorter than the lower. The teeth of the outer series are enlarged; canine teeth none; cleft of the mouth oblique. Sides and crown of the head naked. The spinous dorsal is higher than the soft and lower than the body; caudal obtuse. Green, spotted with violet; cheeks with oblique violet streaks. The rays of the dorsal, caudal, and pectoral fins dotted with brown; the spinous dorsal blackish above. (*Bleek.*)

Rivers of Padang (Sumatra).

49. Gobius sumatranus.

Bleeker, Sumatra, iv. p. 83.

D. $6 \mid \frac{1}{9}$. A. $\frac{1}{8}$. L. lat. 25.

The height of the body is one-eighth of the total length, the length of the head one-fourth; the head is depressed, broader than high; the snout pointed, very slightly convex, with the lower jaw longest. The eyes are very close together, their diameter being one-fourth of the length of the head. The cleft of the mouth is oblique; the teeth of the outer series enlarged. Head naked. The second dorsal equals the body in height, and is higher than the first; the upper pectoral rays silk-like; caudal rounded. Brownish-green, with brown and green points; fins orange-coloured, variegated with brown. (*Bleek.*)

Sea of Padang (Sumatra).

50. Gobius phaiospilosoma.

Bleeker, Verhand. Batav. Genootsch. xxii., *Blenn. en Gob.* p. 30.

D. $6 \mid \frac{1}{8}$. A. $\frac{1}{8}$. L. lat. 20.

The height of the body is contained eight times in the total length, the length of the head four times and a half; the head is rather depressed, broader than high; snout somewhat pointed. The eyes are very close together, their diameter being one-fourth of the length of the head. The cleft of the mouth is oblique; teeth of the outer series enlarged. The first dorsal is as high as the body; caudal rounded. Greenish, with a longitudinal series of six brown spots; a black band from the eye to the maxillary; the second dorsal and the caudal variegated. (*Bleek.*)

Coasts of East Java and Madura.

Dr. v. Bleeker has lately referred this species as a doubtful synonym to *G. kokius,* Bleek., or *G. giuris,* nob. (Enumer. Spec. p. 117).

51. Gobius semidoliatus.

Cuv. & Val. xii. p. 67.

D. $6 \mid \frac{1}{9}$. A. $\frac{1}{8}$.

Canine teeth none. The second dorsal spine is somewhat elongate, its height being equal to that of the body. Deep chestnut-brown, with pale bands edged with black: two before and two between the eyes, three on the neck, and two below the first dorsal; three on the cheek, one on the operculum, and one on the shoulder before the pectoral. (*Val.*)

Sea of Vanicolo. (Red Sea.)

52. Gobius pasuruensis.

Bleeker, Verhand. Batav. Genootsch. xxii., *Blenn. en Gob.* p. 32.

D. $6 \mid \frac{1}{10}$. A. $\frac{1}{10}$. L. lat. 20.

The height of the body is one-seventh of the total length, the length of the head one-fifth; the head is twice as long and broad, as high. Eyes very close together, their diameter being two-sevenths of the length of the head. Canine teeth none; cleft of the mouth oblique, extending to below the eye. The first dorsal is lower than the body; caudal obtusely rounded, its length being nearly one-fifth of the total. Green. (*Bl.*)

Coast of Pasuruan; entering rivers.

It would appear that this Goby is distinguished by very large scales; but we must remark, that the short description was drawn up by Dr. v. Bleeker at an early period, without being afterwards revised.

53. Gobius hoevenii.

Bleeker, Borneo, v. p. 426.

D. $6 \mid \frac{1}{7}$. A. $\frac{1}{7}$. L. lat. 30.

The height of the body is contained five times in the total length, the length of the head four times and a half; the head is somewhat broader than high; the snout obtuse, convex, not longer than the eye, the diameter of which is contained three times and a half in the length of the head, and equal to the width of the interorbital space. The cleft of the mouth is scarcely oblique, with the jaws equal anteriorly, the maxillary extending to below the orbit. Teeth very small. Dorsal fins lower than the body; caudal rounded. Greenish, variegated with blackish; the anterior dorsal black at the base, and with a white band along the middle; the posterior dorsal with a series of brown spots along the base; the other fins green. (*Bleek.*)

Rivers of Sambas (Borneo).

54. Gobius tambujon.

Bleeker, Banten, p. 319.

D. $6 \mid \frac{1}{7}$. A. $\frac{1}{6}$. L. lat. 25–26.

The height of the body is contained five times or five times and a half in the total length, the length of the head four times or four times and a third; the height of the head is three-fourths or five-sevenths of its length; snout obtuse, convex, shorter than the eye, which is one-third of the length of the head; eyes very close together; cleft of the mouth very oblique, the maxillary extending to below the posterior half of the eye. Teeth of the outer series enlarged in the upper jaw; canines none. The third dorsal spine is the longest; caudal rounded. Green, with two series of alternate brownish spots; dorsal with two or three longitudinal, caudal with four or five transverse brownish stripes. (*Bl.*)

Rivers Panimbang and Tjiliwong (Java). Rivers of Bali.

55. Gobius javanicus.

Bleeker, Natuurk. Tydschr. Nederl. Ind. 1856, p. 88.

D. $6 \left| \frac{1}{8} \right.$. A. $\frac{1}{7}$. L. lat. 27–28.

The height of the body is nearly equal to the length of the head, and one-fifth of the total; the height and width of the head are three-fourths of its length. Eyes close together, their diameter being more than one-third of the length of the head; the upper jaw is somewhat longer than the lower; the maxillary extends to below the anterior margin of the eye. Cleft of the mouth little oblique. The teeth form bands, those of the outer series being enlarged. Crown of the head and opercles scaly. Dorsal fins lower than the body; the middle spines of the anterior dorsal are the longest; caudal obtuse, rounded. Green: three deep-violet spots on each side of the head; most of the scales with a brown spot; posterior dorsal and caudal fins brown-dotted; the spinous dorsal with a large round black spot posteriorly. (*Bleek.*)

Rivers of Southern Java. Coast of Booroo.

56. Gobius borneensis.

Bleeker, Borneo, i. p. 10.

D. $6 \left| \frac{1}{7\,(6?)} \right.$. A. $\frac{1}{6\,(5?)}$. L. lat. 24.

The height of the body is contained five times in the total length, the length of the head four times and three-quarters; the head is two-thirds as broad as long. The width of the interorbital space is less than that of the orbit, which is one-third of the length of the head. Teeth very small; cleft of the mouth narrow, not extending on to the orbit. The first dorsal is half as high as the body; caudal rounded. Green, anteriorly clouded with brown: dorsal fins red, the first with a broad black upper margin, the second black-spotted; the other fins immaculate. (*Bleek.*)

Rivers of Bandjermassing (Borneo) and of Sumatra.

57. Gobius melanurus.

Bleeker, Verhand. Batav. Genootsch. xxii., *Blenn. en Gob.* p. 31.

D. $6 \left| \frac{1}{7} \right.$. A. $\frac{1}{7}$. L. lat. 20.

The height of the body equals the length of the head, and is one-fifth of the total. The head is somewhat broader than high, convex and obtuse; the eyes are close together, their diameter being one-third or one-fourth of the length of the head. The upper jaw with the teeth of the outer series enlarged; canine teeth none. The first dorsal is lower than the body; caudal convex. Head, the first dorsal and the caudal black; the remainder brown. (*Bleek.*)

Coasts of Java and Biliton.

With regard to the small number of scales in the lateral line, see the note on *G. pasuruensis*, p. 32.

§§ Anterior dorsal with five spines.

* Posterior dorsal eight-rayed.

58. **Gobius oxypterus.**

Bleeker, Java, iii. p. 400.

$$\text{D. } 5 \,\Big|\, \tfrac{1}{7}. \quad \text{A. } \tfrac{1}{12}. \quad \text{L. lat. } 25.$$

The height of the body is contained six times in the total length, the length of the head four times and two-thirds; head pointed, depressed; the width of the interorbital space is less than the diameter of the eye, which is nearly one-third of the length of the head. Gape oblique, with the lower jaw longest; teeth small, in a single row. Head and nape naked. Dorsal fins remote from each other, the second anteriorly much higher than the first, and also higher than the body; caudal rounded. Greenish: lips black; anal rays with violet dots. (*Bleek.*)*

Lake Grati (Province of Pasuruan, in Java).

** Posterior dorsal eleven-rayed.

59. **Gobius fasciatus.**

Ctenogobius fasciatus, *Gill, Freshwater Fishes of Trinidad, in Ann. Lyc. Nat. Hist. New York,* 1858, p. 16 (sep. copy).

D. 5 | 11. A. 10.

The height of the body is little more than one-seventh of the total length, the length of the head less than one-fifth; the width of the body between the pectoral fins is three-quarters of its greatest height. The eyes are more than a quarter of the length of the head, and are distant the length of one of their diameters from the snout; they are very close together. Yellowish, with four linear black spots on the side; a dark spot and numerous black dots on the base of the caudal fin; caudal crossed by five zigzag linear black bands, dorsal with three or four sublinear black spots; anal, pectoral, and ventral fins yellowish. Head with scattered black dots; a dark triangular spot on the operculum. (*Gill.*)

Fresh waters of Trinidad.

β. Head as high as long.

60. **Gobius echinocephalus.**

Gobius echinocephalus, *Rüpp. Atl. Fische,* p. 136, and *N. W. Fische,* pp. 137 & 138; *Cuv. & Val.* xii. p. 134.

$$\text{D. } 6 \,\Big|\, \tfrac{1}{10}. \quad \text{A. } \tfrac{1}{9}. \quad \text{L. lat. } 23.$$

Body thick, its height being contained three times and a fifth in the total length. Head convex, as high as long, one-fourth of the total length. Teeth very fine. Dorsal fins subcontinuous; caudal rounded; ventral subcircular. Scales of moderate size; head with small prickles. Brownish.

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* This species, technically, ought to be referred to *Euctenogobius*, but it does not appear to have a natural affinity to the typical species of that genus.

Massuah; Sea of China.

a, b. Fine specimens. Red Sea. Collected and presented by Dr. E. Rüppell.

c. Adult: not good state. China Seas. Presented by Captain Sir E. Belcher, C.B.

bb. Canine teeth present.

α. Head as high as long.

61. Gobius amiciensis.

Cuv. & Val. xii. p. 135.

$$D.\ 6 \left| \frac{1}{10}.\quad A.\ \frac{1}{9}. \right.$$

Body thick, its height being equal to the length of the head, and one-fourth of the total. Head convex, as high as long. Canine teeth. Caudal rounded; ventral subcircular. Scales of moderate size. Brownish. (*Val.*)

Tongatabou. Carteret Harbour (New Zealand).

β. Head longer than high.

aa. The first spine of each of the dorsal fins stiff.

62. Gobius bitelatus.

Cuv. & Val. xii. p. 89.

$$D.\ 6 \left| \frac{1}{10}.\quad A.\ \frac{1}{9}. \right.$$

The height of the body is one-fifth of the total length, the length of the head somewhat less than one-fourth. The profile of the head descends obliquely, and is slightly convex. Dorsal fins rather lower than the body, the first spine of each being strong, not flexible. Canine teeth. Scales large. Greyish, with pearl-coloured dots on the sides of the head and body; some small black spots along the back, and on the sides of the tail; caudal dotted with brown. (*Val.*)

Red Sea.

63. Gobius notacanthus.

Bleeker, Goram, p. 210.

$$D.\ 6 \left| \frac{1}{9}.\quad A.\ \frac{1}{10}.\quad L.\ lat.\ 28. \right.$$

The height of the body is contained five times and a half in the total length, the length of the head four times and two-thirds. The eyes are very close together, and occupy the middle third of the length of the head. The snout is very obtuse, convex. The teeth of the outer series are enlarged; canine teeth in the lower jaw. Cleft of the mouth oblique; head naked. The first spine of each of the dorsal fins is strong, not flexible; the other spines are produced, higher than the body, the fourth and fifth being the longest; the second dorsal is lower than the body; caudal rounded. Greenish: each scale with pearl-coloured, violet-edged dots; a series of from three to five brownish spots along the side; sides of the head with short bluish, violet-edged streaks; the second dorsal with bluish dots, pectoral with minute white dots; anal fin with short, oblique, white streaks. (*Bleek.*)

Sea of Goram.

Perhaps identical with *Gobius bitelatus.*

64. **Gobius caninoides.**

Bleeker, Amboina & Ceram, p. 274.

$$\text{D. } 6 \left| \tfrac{1}{10}. \right. \quad \text{A. } \tfrac{1}{10}. \quad \text{L. lat. } 30.$$

The height of the body is contained five times and a half to six times in the total length, the length of the head four times and a half. The eyes are very close together, and the length of their diameter is contained three times to three times and a half in that of the head. The snout is obtuse, convex, shorter than the eye. The teeth of the outer series are enlarged; canine teeth in the lower jaw. The first spine of each of the dorsal fins is strong, not flexible; none of the spines are produced; the vertical fins lower than the body; caudal rounded. Green, with blackish spots; most of the scales with a blackish dot. Dorsal and caudal fins with series of blackish dots; anal violet. (*Bleek.*)

Seas of Amboyna, Celebes, and Booroo.

ββ. All the spines and rays of the fins flexible.

65. **Gobius capistratus.**

Peters in Wiegm. Archiv, 1855, p. 251.

$$\text{D. } 6 \left| \tfrac{1}{12}. \right. \quad \text{A. } \tfrac{1}{12}. \quad \text{L. lat. } 31.$$

Scales in nine longitudinal series. The height of the body is contained four times and a half in the total length (without caudal), the length of the head three times and a half. Snout short, convex; the eyes are very close together, and occupy the second quarter of the length of the head. Teeth of the outer series enlarged; the outermost of the lower jaw curved and depressed. Dorsal fins lower than the body; caudal rounded; none of the upper pectoral rays silk-like. Greenish, with five broad brown cross-bars on the back, alternating with others crossing the lower part of the body; scales more or less distinctly white-spotted; a brown vertical band through the eye; pectorals dotted with white; the first spine of the anterior dorsal, the rays of the posterior and the caudal fin brown-spotted. (*Pet.*)

Ibo (coast of Mozambique).

This species appears to be closely allied to *Gobius ophthalmotænia,* Bleek.

66. Gobius ophthalmotænia.

Bleeker, Kokos-Eiland. p. 46.

$$\text{D. } 6 \,\Big|\, \frac{1}{11\text{–}12}. \quad \text{A. } \frac{1}{11}. \quad \text{L. lat. } 27.$$

The height of the body is contained five times and a half to five times and two-thirds in the total length, the length of the head four times and a half to four times and two-thirds. The head is nearly as broad as high; the snout obtuse, convex. The eyes are very close together, and their diameter is one-fourth of the length of the head. The cleft of the mouth is oblique; teeth of the outer series enlarged; the lower jaw with a lateral canine tooth. Sides and crown of the head scaly. The first dorsal is lower than the second, which is lower than, or as high as, the body; caudal rounded; the upper pectoral rays silk-like. Green, clouded with darker, and dotted with brown and bluish: a blue vertical band through the eye; snout and cheeks with yellow dots; the anterior dorsal with blackish spots anteriorly and with yellow ones posteriorly; the second dorsal brown-spotted; pectoral and ventral fins reticulated with brownish-violet, and minutely dotted with bluish; caudal with numerous brownish and blue dots, and with the lower margin violet.

Sea of New Selma; coasts of Celebes; China Seas.

a. China Seas. Presented by Captain Sir E. Belcher, C.B.

67. Gobius chinensis.

Gobius chinensis, *Osbeck, Reise nach China*, p. 340; *Cuv. & Val.* xii. p. 138; *Richards. Ichth. Chin.* p. 204.
—— eleotris, *L. Syst. Nat.* 12th edit. p. 449.
? Gobius unicolor, *Cuv. & Val.* xii. p. 88 (not *Kuhl & van Hass.*).

D. 6 | 11. A. 10. L. lat. 35.

Thirteen longitudinal series of scales between the second dorsal and the anal fins. The height of the body is contained five times and a quarter in the total length, the length of the head four times and three-quarters. The head is as broad as high, and one-fourth longer than broad. Snout obtuse, rounded, with the gape oblique, and with the lower jaw somewhat prominent, longer than the eye, the diameter of which is one-sixth of the length of the head, and equal to the width of the interorbital space. Cheeks with series of minute warts. The nape and the upper part of the operculum covered with small scales. Dorsal fins lower than the body, the rays of the second becoming gradually longer posteriorly; caudal somewhat pointed; none of the pectoral rays silk-like. Yellowish (in spirits), with very indistinct darker markings; many scales with a shining pearl-coloured spot.

Seas of China. (? Rivers of Java.)

a, b. Adult. China.

Valenciennes' description of *G. unicolor* is evidently taken from a fish very different from the typical specimen preserved in the Leyden Museum.

68. Gobius caninus.

Gobius caninus, *Cuv. & Val.* xii. p. 86; *Bleek. Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* p. 27.

—— grandinosus, *Valenc. in Voy. Bonite, Poiss.* p. 177. pl. 5. fig. 4.

D. $6 \big| \frac{1}{9}$. A. $\frac{1}{9}$. L. lat. 27–30.

Nine longitudinal series of scales between the second dorsal and the anal. The height of the body is contained five times and a half or six times in the total length, the length of the head four times and a half or four times and three-quarters. The eyes occupy the second quarter of the length of the head, and are very close together. The lower jaw with two canine teeth. Series of minute warts on the cheek. Scales large, those of the occiput small. The first dorsal is lower than the body, and the second and third spines are produced in the male; caudal obtusely rounded. Greenish, with large irregular brown spots disposed in two alternate longitudinal series, and with numerous yellow dots; a blue spot on the shoulder.

East Indian Archipelago and coasts of China, entering rivers.

a. Adult. China. Presented by Captain Sir E. Belcher, C.B.
b–c. Adult. Amoy.

69. Gobius venenatus.

Cuv. & Val. xii. p. 85.

D. $6 \big| \frac{1}{10}$. A. $\frac{1}{9}$. L. lat. 35.

Ten longitudinal series of scales between the second dorsal and the anal. The scales on the nape and before the dorsal, on the upper part of the operculum and round the pectoral fin, are much smaller than those on the body and on the tail. The height of the body is contained five times in the total length, the length of the head four times and a third. The head is as broad as high, with the cheeks swollen; two longitudinal and many vertical series of minute pores on the cheek. The width of the interorbital space is less than the diameter of the eye, which is one-fifth of the length of the head. Snout longer than the eye, with the cleft of the mouth oblique, and with the lower jaw longest. Teeth of the outer series of irregular size; a curved canine tooth on each side of the jaw. None of the pectoral rays silk-like; the posterior rays of the dorsal and anal fins are the longest, longer than the second and third dorsal spines. Caudal fin rounded, somewhat pointed, nearly as long as the head; the ventral fin terminates at some distance from the vent, and has the basal membrane well developed. Reddish-olive (in spirits), with a series of ill-defined darker spots along the side; each scale with a lighter centre; a whitish spot, broadly edged with bluish, above the operculum; the spinous dorsal fin with a black spot anteriorly; a white band, inferiorly edged with blackish, on and along the upper margin of the caudal fin.

Pondicherry. Kurrachee.

An adult specimen, brought by Messrs. von Schlagintweit from Kurrachee, is in the East India Collection.

70. Gobius cyanomos.

Bleeker, Verhand. Batav. Genootsch. xxii., *Blenn. en Gob.* p. 25.

D. $6 \left| \frac{1}{10} \right.$. A. $\frac{1}{9}$. L. lat. 30.

The height of the body is contained six times in the total length, the length of the head four times and a half; the head is as broad as high; the width of the interorbital space is less than the diameter of the eye, which is one-fifth of the length of the head. Teeth of the outer series enlarged; a canine tooth on each side of the lower jaw. Scales of the occiput small. The first dorsal fin is lower than the body, and the second and third spines are produced into filaments in the male; caudal rounded. *Male* green, with four or five longitudinal series of yellowish dots; a blue spot on the shoulder; the second dorsal blackish, with white spots and red margin; ventrals and anal violet; caudal with a brown spot superiorly at the base. *Female* with green dorsal fins. (*Bleek.*)

Seas of Madura, Banka, and Java.

71. Gobius chlorostigmatoides.

Bleeker, Verhand. Batav. Genootsch. xxii., *Blenn. en Gob.* p. 26.

D. $6 \left| \frac{1}{10} \right.$. A. $\frac{1}{9}$. L. lat. 30.

The height of the body is one-sixth of the total length, the length of the head one-fifth; the head is as high as broad; cleft of the mouth oblique. Teeth of the outer series enlarged; a canine tooth on each side of the lower jaw. The diameter of the eye is one-fifth of the length of the head, and equals the width of the interorbital space. Sides of the head naked; scales on the occiput small. The first dorsal is lower than the body; caudal obtuse. Green: each scale on the side of the body with a brown spot; the second dorsal, the anal and caudal variegated with black; caudal with a brown spot superiorly at the base. (*Bleek.*)

Seas of Madura, Java, and Borneo.

72. Gobius frenatus.

D. $6 \left| \frac{1}{10} \right.$. A. $\frac{1}{10}$. L. lat. 35.

Ten longitudinal series of scales between the second dorsal fin and the anal. The height of the body is contained nearly six times in the total length, the length of the head four times and a half; the head is higher than broad; the snout obtuse, convex, much longer than the eye; the cleft of the mouth oblique, with the jaws equal anteriorly; the maxillary extends to the vertical from the anterior margin of the eye. Teeth of the outer series enlarged; a canine tooth on each side of the lower jaw. The width of the interorbital space is somewhat less than the diameter of the eye, which is nearly one-seventh of the length of the head. Head and nape naked. The dorsal fins are equal in height, and lower than the body; the second, third and fourth spines of the anterior dorsal are the highest, terminating in very fine short filaments; caudal fin rounded, one-fifth of the total length; the ventral reaches nearly to the vent; none of the pectoral rays silk-like. Brown (in spirits), with darker spots; head with some indistinct darker dots; a blackish band edged with lighter from the maxillary to the lower part of the root of the pectoral; another, which is narrower, and sometimes indistinct, runs parallel to the former to the upper part of the root of the pectoral. Dorsal fins with a transparent margin, the anterior brownish, the posterior with oblique blackish lines; the upper half of the caudal with brown crescent-shaped dots between the rays; anal, ventral, and pectoral blackish; the latter with the base of lighter colour and with two blackish spots, produced by the bands described.

Australia.

a–g. Fine specimens. Australia. From Mr. Gould's Collection.

	lines.
Total length	46
Height of the body	8
Length of the head	10
Diameter of the eye	$1\frac{1}{2}$
Length of the caudal fin	9

73. Gobius cyanoclavis.

Cant. Catal. Mal. Fishes, p. 185.

$$\mathrm{D.}\ 6 \left| \tfrac{1}{10}. \quad \mathrm{A.}\ \tfrac{1}{10}. \quad \mathrm{L.\ lat.}\ 32. \right.$$

Seven longitudinal series of scales between the second dorsal and the anal. The height of the body is one-sixth of the total length, the length of the head one-fifth; the breadth of the latter at the nape is contained twice and a half in the depth, which exceeds one-half of the length of the head. The length of the diameter of the eye is one-fifth of that of the head, and considerably more than the width of the interorbital space. Snout obtuse, rather longer than the eye; cleft of the mouth oblique, with the lower jaw slightly projecting beyond the upper; one or two canine teeth on each side of the lower jaw. The scales of the nape and of the sides of the head are much smaller than those of the body. The spines of the anterior dorsal produced, sometimes very long; the second dorsal and the anal posteriorly as high as the body; caudal a little pointed. Greenish-grey, the scales with a central azure spot: anterior dorsal clouded with brown; posterior dorsal and caudal with series of white spots and with the upper margin orange; the other fins black; the anterior margin of each of the anal rays accompanied by a blue streak.

Sea of Pinang.

a, b. Adult and half-grown: skins. From Dr. Cantor's Collection. Types of the species.

74. Gobius brevirostris.

D. 6 | 11. A. 10. L. lat. 48.

The height of the body is contained seven times in the total length, the length of the head five times and a half. Snout obtuse, as long as the orbit, with the cleft of the mouth oblique and with the lower jaw slightly prominent. The maxillary extends somewhat beyond the vertical from the anterior margin of the eye. Eyes close together, their diameter being two-ninths of the length of the head. Sides of the head and occiput naked; the scales on the anterior part of the body are considerably smaller than the remainder, which are ctenoid. Thirteen or fourteen longitudinal series of scales between the second dorsal and the anal. A small canine tooth on the middle of the lower jaw. None of the pectoral rays silk-like; the ventral terminates at a great distance from the vent. Dorsal fins rather lower than the body; the second spine of the anterior dorsal is the longest. Caudal slightly pointed, one-fifth of the total length. Uniform brownish-olive (in spirits); the second dorsal with series of brown dots; caudal, anal, and ventral with the margins blackish.

Total length 29 lines.

China.

a. China. Presented by J. R. Reeves, Esq.

75. Gobius cauerensis.

Bleeker, Sumatra, ii. p. 269.

D. 6 $\big| \frac{1}{9}$. A. $\frac{1}{11}$. L. lat. 25.

Canine teeth in both jaws. The height of the body is contained five times and a half in the total length, the length of the head four times and a half. The head is higher than broad, its width being one-half of its length. Eyes very close together; their diameter is about one-third of the length of the head. Snout obtuse; the cleft of the mouth oblique, with the jaws equal anteriorly. Crown and sides of the head scaly. Caudal rounded; the anterior dorsal lower than the posterior. Olive: a brown cross-band below the eye; opercles with blue dots; body with seven or eight brown longitudinal bands; a series of five round brown spots behind the pectoral; fins yellow; pectoral, dorsal, and caudal dotted with brown; anal with a broad black margin. (*Bleek.*)

Sea of Cauer (Sumatra).

76. Gobius bontii.

Bleeker, Verhand. Batav. Genootsch. xxii., *Blenn. en Gob.* p. 27.

D. 6 $\big| \frac{1}{11}$. A. $\frac{1}{10}$. L. lat. 30.

The height of the body is contained six times in the total length, the length of the head five times and three-fourths; the head is half as high and broad as long, obtuse and convex; the eyes are very close together, and their diameter is contained three times and a half in the length of the head. Teeth of the outer series enlarged; a canine tooth on each side of the lower jaw. Scales on the occiput small. The first dorsal is lower than the body, with the second and third spines produced into filaments (in the male?); the length of the caudal fin is contained four times and a quarter in the total. Green: tail with a longitudinal series of black spots; base of the dorsal fins brown-spotted; anal yellow at the base and black at the margin; caudal dotted with black; pectorals and ventrals greenish. (*Bleek.*)

Coasts and rivers of Madura and Java.

a. Not good state. Purchased of Mr. Frank.

77. Gobius phaiomelas.

Bleeker, Verhand. Batav. Genootsch. xxii., *Blenn. en Gob.* p. 28.

D. 6 $\big| \frac{1}{11}$. A. $\frac{1}{9}$. L. lat. 30.

The height of the body is contained six times and a half in the total length; the head is as broad as high; the length of the diameter of the eye is two-ninths of that of the head, and equals the width of the interorbital space. Teeth of the outer series enlarged; a pair of canine teeth. Scales on the occiput small. The first dorsal is lower than the body; caudal rounded. Brown: fins black or blackish; the second dorsal and the caudal spotted with darker. (*Bleek.*)

Coasts of Madura and Java.

78. Gobius xanthosoma.

Gobius xanthosoma, *Bleeker, Ceram,* ii. p. 703.
Gobiodon xanthosoma, *Bleeker, Enumer. Spec.* p. 120.

D. 6 $\big| \frac{1}{10}$. A. $\frac{1}{9}$. L. lat. 22.

The height of the body is contained four times in the total length, the length of the head three times and three-quarters; the head is somewhat higher than broad; the snout obtuse, convex, shorter than the eye. The width of the interorbital space is less than the diameter of the eye, which is one-fourth of the length of the head. Head and neck naked. The cleft of the mouth is very oblique, with the lower jaw rather longer; teeth of the outer series enlarged; two canine teeth near the symphysis of the lower jaw. Dorsal fins lower than the body; caudal obtuse. Uniform yellow; the first dorsal brown. (*Bleek.*)

Coasts of Celebes, Booroo, Amboyna, Ceram, and Goram.

Gobius melanosoma, Bleek. Ceram, ii. p. 703, is very similar to this species, but uniform black.

79. Gobius baliuroides.

Bleeker, Verhand. Batav. Genootsch. xxii., *Blenn. en Gob.* p. 26.

D. 6 $\big| \frac{1}{9}$. A. $\frac{1}{9}$. L. lat. 25?

The height of the body is contained seven times in the total length, the length of the head four times and a half; the head is as broad as high. The eyes are very close together, one-third of the length of the head. The cleft of the mouth is oblique; a canine tooth on each side of the lower jaw. The first dorsal is as high as the body;

caudal rounded. Brownish; a dark spot on the middle of the base of the caudal fin. (*Bleek.*)

Coast of Sumanap (East Madura).

80. Gobius gymnauchen.

Bleeker, Act. Soc. Sc. Indo-Nederl. vi., *Japan,* vi. p. 84. tab. 1. fig. 2.

D. $6 \left| \frac{1}{9} \right.$. A. $\frac{1}{9}$. L. lat. 25.

The height of the body is contained eight times in the total length, the length of the head four times and two-thirds; head nearly as high as broad. The diameter of the eye is one-fourth of the length of the head; eyes very close together; snout convex, shorter than the eye; head and neck to the origin of the spinous dorsal naked; cleft of the mouth oblique, with the lower jaw longest; the maxillary extends to below the anterior half of the orbit. The teeth of the outer series are enlarged; the lower jaw has a curved canine tooth on each side, and a series of small horizontal teeth anteriorly. Scales ctenoid, those on the posterior parts being the largest. Dorsal fins slightly contiguous at the base; the second spine is produced into a long filament. No silk-like pectoral rays; caudal rounded, its length being rather less than one-fourth of the total. Greenish, variegated with darker; dorsal and caudal fins with brown spots, those on the former in three or four longitudinal series; ventral and anal violet. (*Bl.*)

Rivers of Jeddo.

81. Gobius pleurostigma.

Bleeker, Verhand. Batav. Genootsch. xxii., *Blenn. en Gob.* p. 28.

D. $6 \left| \frac{1}{7} \right.$. A. $\frac{1}{8}$. L. lat. 30.

The height of the body is contained four times and three-quarters or five times in the total length, and nearly equal to the length of the head; the head is as broad as high; the diameter of the eye is one-fourth of the length of the head, and equal to the width of the interorbital space. Two canine teeth in the middle of the lower jaw. Scales on the occiput large. The first dorsal is lower than the body, with the second and third spines produced into filaments in the male; caudal rounded. Green, with a lateral longitudinal series of eight or ten black dots; vertical fins black; the first dorsal yellow at the top, and the anal dotted with yellow; the other fins green. (*Bleek.*)

Fresh waters of Java.

82. Gobius gastrospilus.

Bleeker, Batavia, p. 477.

D. $6 \left| \frac{1}{7} \right.$. A. $\frac{1}{7}$. L. lat. 26.

The height of the body is one-sixth of the total length, the length of the head one-fifth. The head is as high as broad; the snout obtuse, convex, shorter than the eye; the cleft of the mouth slightly oblique; the lower jaw has a small canine tooth on each side, and the teeth of the outer series are enlarged. The eyes are close together, and their diameter is contained four times and a half in the length of the head. Head scaly. The first dorsal is lower than the second, and as high as the body; caudal rounded. Green: most of the scales with a brown spot; rays of the vertical fins dotted with brown; spinous dorsal with a blue spot posteriorly. (*Bleek.*)

Sea of Batavia.

83. **Gobius macrostoma.**

D. 6 | 8. A. 7. L. lat. 27.

Ten longitudinal series of scales between the origin of the posterior dorsal and the anal. Head and body very compressed; the height of the body is contained three times and three-fifths in the total length, the length of the head four times. The depth of the head above the præoperculum is not much less than its length, and much more than its width. Eye rather small, its diameter being one-seventh of the length of the head, equal to the width of the interorbital space, and less than the extent of the snout. Cleft of the mouth slightly oblique, wide, reaching backwards to the vertical from the posterior margin of the eye, with the jaws equal in front. Each of the jaws with a pair of small canine teeth anteriorly. Cheeks naked; operculum scaly. Scales minutely striated and ciliated. The two anterior dorsal spines are the longest, somewhat produced, but much lower than the body. Caudal rounded, its length being contained five times and a half in the total. The pectoral has no silk-like rays, and extends to the origin of the anal. Ventral reaching to the vent, with the basal membrane well developed. Brownish (in spirits), with irregular, narrow, oblique darker streaks; the anterior dorsal with two black longitudinal stripes, the lower of which is dilated into a blackish blotch posteriorly; the second dorsal with three rather irregular serrated blackish bands, and with white spots between them. Caudal dotted with brown; anal blackish.

	lines.
Total length	20
Length of the head	5
Height of the body	$5\frac{1}{2}$
Diameter of the eye	$0\frac{2}{3}$
Length of the caudal fin	$3\frac{1}{2}$

Australia.

a. Apparently mature. Australia. From Mr. Gould's Collection.

b. Caudal fin elongate, pointed.

84. **Gobius acutipinnis.**

Gobius acutipennis, *Cuv. & Val.* xii. p. 80 (not *Cant.*).
—— setosus, *Cuv. & Val.* xii. p. 81.

D. $6 \mid \frac{1}{10}$. A. $\frac{1}{11}$.

The height of the body equals the length of the head, and is one-sixth of the total. The head is one-fourth less high and one-third less broad than long. The width of the interorbital space is one-half of the diameter of the eye. Scales large; teeth small. The fifth dorsal spine is the longest, filiform; the other fins pointed posteriorly. Yellowish-brown, clouded with darker; a bluish line from the eye to the angle of the mouth; dorsal fins with greyish longitudinal lines; the upper part of the caudal and the anterior margin of the dorsal fins dotted with black and white. (*Val.*)

Malabar.

85. Gobius spectabilis.

D. 6 | 10. A. 9. L. lat. 32.

Nine longitudinal series of scales between the second dorsal and the anal fins. The height of the body is contained eight times in the total length, the length of the head four times and a half; the head is depressed, broader than high; the snout elongate, broad, flat, with the lower jaw prominent. Several teeth of the outer series are enlarged, canine-like, but there are no lateral canine teeth. The width of the interorbital space is more than the diameter of the eye, which is one-sixth of the length of the head. The distance of the first dorsal from the eye equals that of the snout from the præopercular margin. Head naked; scales on the nape of the neck smaller than those of the body. Dorsal fins higher than the body; the spines of the first are produced into filaments, and the second and third are the longest. Caudal elongate, obtusely pointed, one-fourth of the total length; none of the pectoral rays silk-like; ventral with the basal membrane well developed. Yellowish-brown, with indistinct blotches along the side; dorsal, caudal, and pectoral fins brown-dotted.

East Indies.

a. Adult. India. Presented by G. R. Waterhouse, Esq.

	inches.	lines.
Total length	10	0
Height of the body	1	3
Length of the head	2	3
Diameter of the eye	0	3
Length of the caudal fin	2	6

The natural affinities of this species are to *G. giuris*, from which it is readily distinguished by the extraordinary development of the caudal fin.

86. Gobius signatus.

Peters in Wiegm. Arch. 1855, p. 253.

D. 6 | $\frac{1}{10}$. A. $\frac{1}{10}$. L. lat. 30.

Eight or nine longitudinal series of scales between the first dorsal and the vent. The height of the body is one-fifth of the total length (without caudal), the length of the head one-fourth; the head is rather higher than broad, and one-fourth longer than high; the snout very slightly convex. The eyes occupy the second quarter of the length of the head, and are distant from each other half the length of their diameter. Teeth of the outer series enlarged. Dorsal fins rather lower than the body, with the last rays somewhat longer; caudal pointed, as long as the head; none of the pectoral rays silk-like. Head naked. Greenish, with irregular blackish-brown blotches; sides of the head with bluish spots; pectoral and caudal white-spotted; ventrals brownish-black towards the extremity; anal with indistinct whitish spots along the base; a large blackish-blue ocellus between the fifth and sixth dorsal spines. (*Pet.*)

Mozambique.

87. **Gobius schlegelii.**

D. 6 | 10. A. 10. L. lat. 28.

Eight longitudinal series of scales between the second dorsal fin and the anal. The height of the body is contained four times and a half in the total length (without caudal), the length of the head three times and a half. The eyes are close together, situated in the anterior half of the head, their diameter being one-fifth of the length of the head. Head rather compressed, much higher than broad; snout much longer than the eye, with the cleft of the mouth very oblique, and with the lower jaw prominent. A canine tooth on each side of the mandibula. Head naked; scales on the neck much smaller than those on the body. Scales ctenoid. The second and third dorsal spines are the longest, filiform, lower than the body, and equal in height to the second dorsal fin. Caudal fin elongate, pointed, one-fourth of the total length. None of the pectoral rays silk-like; the ventral extends on to the vent, and has the basal membrane very broad. Brown: a series of short vertical black lines on the lower half of the tail; base of the pectoral with a black ring, including a whitish centre; anal with a black longitudinal band along the base.

Length 4 inches.

Hab. Boutry, Gold Coast.

The typical specimen is in the Leyden Museum.

88. **Gobius polynema.**

Chæturichthys polynema, *Bleeker, Verhand. Batav. Genootsch.* xxv., *Japan*, p. 44. fig. 4.

D. 6 | 11. A. 10. L. lat. 30.

Lower jaw with several small barbels. Eight longitudinal series of scales between the second dorsal fin and the anal. The height of the body is contained seven times and a third in the total length. the length of the head five times. The head is as broad as high; the snout broad, rounded, rather longer than the orbit; the cleft of the mouth oblique, with the jaws equal anteriorly. The maxillary does not extend to the vertical from the centre of the orbit. Teeth of the outer series enlarged; a small canine tooth on each side of the lower jaw. The width of the interorbital space equals the vertical diameter of the eye; its horizontal diameter is nearly one-fourth of the length of the head; sides of the head and nape of the neck scaly. The anterior dorsal fin is lower than the posterior, the height of which equals that of the body; caudal pointed, its length being more than one-fourth of the total. Greenish: fins violet. A black ocellus edged with white on the upper portion of the caudal fin, near the base. Traces of fine longitudinal lines are visible on the anal fin.

Chinese and Japanese Seas. Madras.

a. China. Presented by J. R. Reeves, Esq.
b. Madras. Presented by T. C. Jerdon, Esq.

	lines.
Total length	52
Height of the body	7
Length of the head	10
——— of the caudal fin	14
Horizontal diameter of the eye	$2\frac{3}{4}$

89. **Gobius margariturus.**

Richards. Ichthyol. China, p. 205.

$$D.\ 6 \mid \frac{1}{12}.\quad A.\ \frac{1}{10}.$$

The height of the body is about one-eighth of the total length; head bluntly rounded in profile at the snout, with the jaws equal. Eyes a full diameter apart. Teeth of the outer series enlarged; lower jaw with a lateral canine tooth. Caudal pointed. Scales pretty large, ciliated. A series of silvery specks running down the middle of the tail; a few silvery specks on the nape, one on the temples, another on the gill-cover, and two lines of pores on the cheek. (*Rich.*)

Macao.

90. **Gobius temminckii.**

Bleeker, Verhand. Batav. Genootsch. xxii., *Blenn. en Gob.* p. 33.

$$D.\ 6 \mid \frac{1}{9}.\quad A.\ \frac{1}{9}.\quad L.\ lat.\ 16\text{–}20.$$

The height of the body is contained seven times and a half in the total length, the length of the head five times and a third; the head is as high as broad, obtuse and convex; the eyes are very close together, and the length of their diameter is two-sevenths of that of the head. The teeth of the outer series in the upper jaw are enlarged; canine teeth none. The first dorsal is as high as the body; caudal pointed, its length being one-third of the total. Green: the first dorsal black, pectorals and caudal green, the others brown. (*Bleek.*)

Coast of Java.

91. Gobius mystacinus.

Cuv. & Val. xii. p. 124.

$$D.\ 6 \left| \frac{1}{10}. \quad A.\ \frac{1}{9}. \right.$$

The maxillaries are produced posteriorly, extending to the præoperculum. The height of the body is contained five times and a half in the total length, the length of the head four times. Canine teeth none. Caudal fin somewhat pointed. Scales of moderate size. Yellowish-brown, with indistinct cross-bars. (*Val.*)

Java.

This species appears to be the type of a separate genus.

B. Scales rather small, fifty or more in a longitudinal series.

1. A tentacle above the orbit: Oxyurichthys, part., *Bleek.*

92. Gobius tentacularis.

Gobius tentacularis, *Cuv. & Val.* xii. p. 128; *Bleeker, Java,* ii. p. 434.
—— macrurus, *Bleeker, Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* p. 35.
Oxyurichthys tentacularis, *Bleeker, Enum. Spec.* p. 120.

$$D.\ 6 \left| \frac{1}{12}. \quad A.\ \frac{1}{13}. \quad L.\ lat.\ 60\text{–}70. \right.$$

A simple tentacle above the orbit, as long as the eye. The height of the body is contained seven times to nine times and a half in the total length, the length of the head six times and a half to seven times. Eyes very close together. Canine teeth none. Greenish, spotted with reddish.

Coasts of Java, Madura, and Sumatra.

93. Gobius ophthalmonema.

Gobius ophthalmonema, *Bleeker, Ternate,* viii. p. 208.
Oxyurichthys ophthalmonema, *Bleeker, Enum. Spec.* p. 120.

$$D.\ 6 \left| \frac{1}{12}. \quad A.\ \frac{1}{13}. \quad L.\ lat.\ 55. \right.$$

A simple tentacle above the orbit, shorter than the eye. The height of the body is contained seven times in the total length, the length of the head five times and a half; the head is higher than broad; the snout obtuse, convex, shorter than the eye. The eyes are very close together, and their diameter is three-tenths of the length of the head (?). Gape oblique, with the jaws equal; teeth of the outer series enlarged; canine teeth none. Head naked. The first dorsal spine is produced into a filament, the posterior dorsal fin lower than the body; caudal rhomboidal, its length being more than one-fourth of the total. Olive, with five brownish blotches along the side; dorsal fins with two series of blackish dots; pectorals and the upper half of the caudal black-dotted; ventral and anal brown. (*Bleek.*)

Sea of Ternate.

2. No tentacle above the orbit.

a. Caudal fin elongate, pointed: Oxyurichthys, part., *Bleek.*

94. Gobius microlepis.

Gobius acutipinnis, var., *Cantor, Catal.* p. 184.
—— microlepis, *Bleek. Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* p. 35, and *Java*, ii. p. 436.
Oxyurichthys microlepis, *Bleek. Enum. Spec.* p. 120.

D. $6 \mid \frac{1}{12}$. A. $\frac{1}{13}$. L. lat. 50.

The height of the body is contained from seven times and a third to nine times in the total length, the length of the head six times; the height of the head is contained once and one-half or once and two-thirds in its length. The diameter of the eye is one-fourth of the length of the head; eyes close together. The snout is obtuse, not shorter than the eye; cleft of the mouth very oblique, with the lower jaw longest. The teeth of the outer series are enlarged; canine teeth none. The dorsal fins are higher than the body; the fifth spine of the anterior dorsal is sometimes produced, filiform. Caudal pointed, its length being one-third of the total. Green above, with irregular violet spots; each scale with a blackish dot on the margin; the vertical fins rose-coloured; the spinous dorsal with two or three bluish longitudinal lines, the soft dorsal reticulated with bluish and dotted with blackish; caudal with numerous oblong blackish spots; anal with a yellow and violet margin.

Seas of Pinang, Java, and Madura; Chinese Sea.

a. Skin: bad state. Sea of Pinang. From Dr. Cantor's Collection.

95. Gobius papuensis.

Cuv. & Val. xii. p. 106.

D. $6 \mid \frac{1}{12}$. A. $\frac{1}{13}$. L. lat. 75–80.

Scales small anteriorly, becoming larger on the tail. The height of the body is one-seventh of the total length (without caudal), the length of the head one-fourth. The head is one-third longer than high, and one-third higher than broad. The eyes are very close together, their diameter being one-fifth of the length of the head. Mouth oblique, the maxillary extending to below the middle of the eye; teeth of the outer series enlarged. The length of the caudal is one-fourth of the total. Greyish-brown, clouded with darker; a brown spot at the root of the caudal, another at the base of the pectoral; dorsal fins with fine reticulated lines.

Seas of Australia, New Guinea, and Java.

One of the two specimens from which I have taken the characters is in the Leyden Museum; the colours have gone, except the dark spot at the root of the caudal. It was found in Java by Kuhl and van Hasselt, who intended to call it *Gobius melanostigma*, a name since given by Bleeker to another species. This name would indicate that the specimen was black-dotted during life, a peculiarity occurring in *G. microlepis* according to Bleeker's description. The latter species, however, is said to have much larger scales, viz. fifty in a longitudinal line. The other specimen is in the British Museum; and it also exhibits a very distinct brown spot on the root of the caudal.

a. Adult. Australia. Presented by the Earl of Derby.

96. **Gobius belosso.**

Gobius belosso, *Bleek. Banten,* p. 316.
Oxyurichthys belosso, *Bleek. Enum. Spec.* p. 120.

$$\text{D. } 6 \,\Big|\, \tfrac{1}{13}. \quad \text{A. } \tfrac{1}{13}. \quad \text{L. lat. } 70.$$

Scales small anteriorly, becoming larger on the tail. The height of the body is one-ninth or one-tenth of the total length, the length of the head one-sixth. The eyes are very close together, their diameter being about one-fourth of the length of the head. Snout obtuse, somewhat shorter than the eye, with the cleft of the mouth very oblique; the upper maxillary extends to below the posterior part of the orbit; teeth of the upper jaw in a single series, without canines. The upper pectoral rays silk-like; the length of the caudal is contained $3\frac{1}{2}$ times in the total. Yellowish-rose-coloured, minutely dotted with bluish; dorsal and caudal with reticulated bluish lines; pectoral dotted with white, and with a violet spot superiorly at the base; inferior margins of the anal and caudal violet. (*Bl.*)

Rivers of Banten (Java) and of Nias.

97. **Gobius lanceolatus.**

Gobius, sp., *Gronov. Zoophyl.* p. 82. no. 277. pl. 4. fig. 4 (bad).
—— lanceolatus, *Bl.* ii. p. 8. t. 38. fig. 1; *Bl. Schn.* p. 69; *Lacép.* ii. p. 545. pl. 15. fig. 1; *Cuv. & Val.* xii. p. 114.
—— bacalaus, *Cuv. & Val.* xii. p. 119.

$$\text{D. } 6 \,\Big|\, \tfrac{1}{13}. \quad \text{A. } \tfrac{1}{14}. \quad \text{L. lat. } 70. \quad \text{Vert. } 11/15.$$

Scales small anteriorly, becoming larger on the tail. The height of the body is one-eleventh of the total length, the length of the caudal fin one-third, the length of the head one-seventh. The snout is longer than the eye, which is one-fifth of the length of the head, and more than the width of the interorbital space. The jaws are nearly equal in length; the cleft of the mouth is oblique, and the maxillary reaches to the posterior margin of the orbit. The teeth of the outer series are slightly enlarged. Streaks of minute warts on the sides of the head, but none on the neck. None of the pectoral rays silk-like; the basal membrane of the ventral fin is well developed, without lateral appendages; caudal lanceolate. Brownish-grey.

Fresh waters of Cuba and Martinique; Brazil; Surinam; Guiana.

a, b. Adult. British Guiana. Presented by Sir R. Schomburgk.

c. Adult. Brazils. Presented by Lord Stuart.
d–f. Adult and half-grown. West Indies. From Dr. Parnell's Collection.
g. Many very young specimens. West Indies. Presented by Col. Reid.
h. Large specimen. Old Collection.
i. Adult: skeleton. South America. Presented by Sir R. Schomburgk.

The *skeleton* of this species does not essentially differ from that of other Gobies, the elongate form of the body not being produced by an increase of the number of the vertebræ, but by the single vertebræ being prolonged. The length of the abdominal portion of the vertebral column is to that of the caudal as 1 : 1·4.

b. Caudal fin rounded, not elongate.

aa. Canine teeth none.

98. Gobius marmoratus.

Nordm. in Demid. Voy. Russ. Mérid. iii. p. 435, *Poiss.* pl. 12. fig. 3.

D. 6 | 18–20. A. 18.

Scales rather small. The height of the body is rather more than the length of the head, and one-fifth of the total. Snout of moderate extent, somewhat convex. Dorsal fins lower than the body; caudal rounded. Olive, with subquadrangular brownish spots; a pair of whitish spots on the base of the caudal fin, and a single one below the eye. All the fins, except the ventrals, with series of brown dots, those on the second dorsal and on the anal having an oblique direction. (*Nordm.*)

Sebastopol.

99. Gobius batrachocephalus.

Pall. Zoogr. iii. p. 150; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 409, *Poiss.* pl. 8.

D. 6 | $\frac{1}{18}$. A. $\frac{1}{15}$. L. lat. 75.

Twenty-two series of scales between the second dorsal and the anal fins. The height of the body is contained five times and two-thirds in the total length, the length of the head four times. Head depressed; eyes prominent; snout of moderate extent; cleft of the mouth oblique, with the lower jaw longest; teeth of the outer series enlarged. The width of the interorbital space is less than that of the orbit. Eye of moderate size. Dorsal fins close together; the second is higher than the first, but rather lower than the body: the ventrals do not reach to the vent: caudal rounded. Brownish-yellow, with numerous irregular black spots; fins brown-spotted.

Black Sea.

One specimen in the Poppelsdorf Museum (Bonn).

100. Gobius stevenii.

Nordm. in Demid. Voy. Russ. Mérid. iii. p. 432, *Poiss.* pl. 13. fig. 1.

D. 6 | 18. A. 16.

Scales rather small. The first dorsal subquadrangular, the membrane between the third and fourth spines being more elevated than between the second and third. The height of the body is contained six times in the total length, the length of the head four times and a half. Snout of moderate extent, convex; eye of moderate size. Dorsal fins as high as the body; caudal rounded; the ventrals do not extend on to the vent, and have the basal membrane little developed. Body greyish-brown, with darker spots. (*Nordm.*)

Kertch (Crimea).

101. Gobius lacteus.

Nordm. in Demid. Voy. Russ. Mérid. iii. p. 430, *Poiss.* pl. 10. fig. 3.

D. 6 | 17. A. 16.

Scales rather small. The height of the body is contained five times and a third in the total length, the length of the head four times and a third. Snout of moderate extent, convex, with the lower jaw longest. Teeth of the outer series enlarged. Dorsal fins lower than the body; caudal rounded; the ventrals do not reach to the vent, and have the basal membrane little developed. Nearly uniform greenish-white. (*Nordm.*)

Dniester.

102. Gobius platyrostris.

Pall. Zoogr. iii. p. 154; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 410, *Poiss.* pl. 14. fig. 1.

D. 6 | $\frac{1}{17}$. A. $\frac{1}{13}$.

Scales rather small. The height of the body is contained four times and two-thirds in the total length, the length of the head three times and two-thirds. Head broader than high; snout of moderate extent; cleft of the mouth oblique, with the lower jaw longest; eyes small, their diameter being much less than the width of the interorbital space. Dorsal fins close together; the second is higher than the first, nearly as high as the body: the ventrals do not reach to the vent: caudal rounded. Brownish; fins with series of brownish spots. (*Nordm.*)

Coasts of the Crimea.

103. Gobius paganellus.

Paganellus venetorum, *Willughby*, p. 207; *Ray*, p. 75.
Gobius, sp. 2, *Artedi, Genera*, p. 29; *Hasselq. Reise nach Palæst.* p. 373.
Gobius paganellus, *L. Syst. Nat.* i. p. 449 (not *Cuv. & Val.*).
—— bicolor, *Cuv. & Val.* xii. p. 19 (not *Gm.*).

Gobius niger (part. descr.), *Yarrell, Brit. Fishes,* 2nd edit. i. p. 281, 3rd edit. ii. p. 318.
—— niger, *Thomps. Ann. & Mag. Nat. Hist.* 1839, ii. p. 417.
? Gobius sordidus, *Benn. Proc. Zool. Soc.* iii. 1835, p. 91.

$$\text{D. } 6 \,\Big|\, \frac{1}{(14)\,15\text{–}16}. \quad \text{A. } \frac{1}{(12)\,13\text{–}14}. \quad \text{L. lat. } 54\text{–}55.$$

Fifteen or sixteen longitudinal series of scales between the second dorsal and the anal fins. The height of the body is contained five times and a half in the total length, the length of the head four times and a half. The width of the interorbital space is less than that of the orbit. Dorsal fins close together, rather lower than the body; the distance of the dorsal from the eye equals that of the snout from the præoperculum. The upper rays of the pectoral fin very fine, silk-like; the ventrals do not reach to the vent. Brownish, indistinctly marbled with darker; the first dorsal fin greyish, with a black longitudinal spot, and with a broad colourless upper margin; the other fins blackish, generally with indistinct dots.

Mediterranean; coasts of Great Britain.

a–b. Adult and half-grown. Clonakilty, South Ireland. From the Museum Leach as *Gobius niger.*
c. Half-grown. Frith of Forth.
d, e, f. Fine specimens. Falmouth. Purchased.
g, h. Fine specimens. Madeira.
i. Large specimen. Dalmatia.
k. Adult: skin. Leghorn. From Mr. Yarrell's Collection.
l–p. Adult: skins. From Mr. Yarrell's Collection as *Gobius niger.*
q, r. Adult.

104. **Gobius melanostoma.**

Gobius melanostomus, *Pall. Zoogr.* iii. p. 151; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 411. pl. 7.

D. 6 | 16. A. 14. L. lat. 50–52.

Sixteen longitudinal series of scales between the second dorsal and the anal fins. The height of the body is contained five times and a half in the total length, the length of the head four times and a fourth. The interorbital space is naked, and its width is less than the vertical diameter of the eye. Snout nearly twice as long as the eye, with the jaws equal anteriorly; teeth of the outer series enlarged. Streaks of minute warts below the eye, none on the neck. Dorsal fins close together, of nearly equal height, lower than the body; the distance of the first dorsal from the eye equals that of the snout from the præoperculum. None of the pectoral rays silk-like; basal half of the pectoral scaly; the ventrals do not reach to the vent, and have the basal membrane very developed. Light brown, clouded with darker; the first dorsal with a deep-black spot posteriorly; the outer half of the vertical fins brown.

Black Sea.

A specimen from Varna is in the Collection of the Poppelsdorf Museum (Bonn).

105. Gobius ophiocephalus.

Gobius ophiocephalus, *Pall. Zoogr.* iii. p. 153; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 425, *Poiss.* pl. 10. fig. 2.
Gobius lota, *Cuv. & Val.* xii. p. 27; *Martens in Wiegm. Archiv,* 1857, p. 178.

$$\text{D. } 6 \left| \frac{1}{14\text{–}15}. \quad \text{A. } \frac{1}{13\text{–}14}. \quad \text{L. lat. } 60\text{–}64. \right.$$

Seventeen longitudinal series of scales between the second dorsal and the anal fins. Head rather higher than broad. The height of the body is contained six times and a half in the total length, the length of the head four times and one-third. The vertical diameter of the eye is rather more than one-half the length of the snout, and nearly equal to the width of the interorbital space. The anterior dorsal fin is as high as the body, but lower than the posterior; the distance of the first dorsal from the eye equals that of the snout from the præoperculum. Pectoral without silk-like rays; the ventral has the basal membrane little developed, and does not extend on to the vent. Brownish, marbled with darker; sides of the head and root of the pectoral spotted with whitish; the first dorsal with three pairs of dotted, brownish longitudinal bands; the second and the caudal spotted, the pectoral dotted with brown. A round dark-brown spot at the root of the caudal.

[Fresh waters and] coasts of Italy and Dalmatia. Palestine.

a. Eight inches long. Dalmatia.
b. Adult. Mediterranean. Presented by Dr. A. Günther.
c. Half-grown. Adriatic.
d–f, g. Half-grown. Lake Apollonia (Palestine). Presented by H. Poole, Esq.

106. Gobius cruentatus.

Brünn. Ichth. Massil. p. 33. no. 42.
Gobius cruentatus, *L. Gm.* p. 1197; *Bl. Schn.* p. 72; *Risso, Ichth. Nice,* p. 157, and *Eur. Mérid.* iii. p. 282; *Cuv. & Val.* xii. p. 29; *Cuv. Règne Anim. Ill. Poiss.* pl. 80. fig. 1; *Guichen. Exp. Algér. Poiss.* p. 77.
? Gobius gracilis, *Fries, Vet. Akad. Handl.* 1838, p. 245. tab. 4. fig. 2; *Nilss. Skand. Faun.* iv. p. 224.

$$\text{D. } 6 \left| \frac{1}{14}. \quad \text{A. } \frac{1}{13\text{–}14}. \quad \text{L. lat. } 58. \right.$$

Seventeen or eighteen longitudinal series of scales between the second dorsal and the anal fins. Head as broad as high. The height of the body is contained five times and a half in the total length, the length of the head four times and a half. The horizontal diameter of the eye equals the length of the snout, and is one-fourth of the length of the head; the interorbital space is very narrow and entirely scaleless. Dorsal fins not very close together, somewhat lower than the body; the distance of the first dorsal from the eye is more than that of the snout from the præoperculum; a few of the upper pectoral rays silk-like; the ventral has the basal membrane well developed, and does not extend on to the vent. Sides of the head and nape of the neck with stripes of minute brown warts, those on the neck arranged in a $\widehat{||}$ like figure. Reddish-brown, marbled with brown; sides of the head and vertical fins spotted with vermilion.

Mediterranean. (Coast of Scandinavia?)

a. Adult. Dalmatia.
b. Adult. Sicily. Presented by W. Swainson, Esq., as *Gobius niger*.
c. Adult. Sicily. Presented by W. Swainson, Esq., as *Gobius lanceolatus*.
d, *e*. Young.

Gobius gracilis, Fries, appears to be identical with *G. cruentatus*, Gm., or at least very closely allied to it; whilst *G. gracilis*, Jenyns, perhaps, is founded on young specimens of *G. minutus*.

107. Gobius geniporus.

Gobius geniporus, *Cuv. & Val.* xii. p. 32.

D. $6 \mid \frac{1}{13}$. A. $\frac{1}{12}$. L. lat. 53.

The height of the body is contained seven times or seven times and a half in the total length, the length of the head four times; the head is only half as high and broad as it is long. The eye occupies the second quarter of the length of the head; the width of the interorbital space equals one-half of the diameter of the eye. The lower jaw projects a little. No silk-like pectoral rays; ventral fins without a basal membrane. The distance of the caudal from the two other vertical fins is one-seventh of the length of the body. Streaks of minute pores below the eye and on the neck; four or five large pores along the margin of the præoperculum. Brownish, marbled with darker; fins blackish, dorsal and anal rays with white tips; rays of the caudal with brown spots; head sometimes white-spotted. (*Val.*)

Mediterranean.

108. Gobius capito.

? Gobius exanthematosus, *Pall. Zoogr.* iii. p. 160; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 423, *Poiss.* pl. 10. fig. 1.
Gobius capito, *Cuv. & Val.* xii. p. 21; *Guichen. Exp. Algér. Poiss.* p. 76.
? Gobius paganellus, *Cuv. & Val.* xii. p. 20; *Guichen. Exp. Algér. Poiss.* p. 76; (not *L.*) juv.

D. $6 \mid \frac{1}{13-14}$. A. $\frac{1}{10-11}$. L. lat. 60–65. Vert. 12/16.

Seventeen to twenty longitudinal series of scales between the second dorsal and the anal fins. Head as broad as high. The height of the body is contained five times and a half in the total length, the length of the head four times and a half. The horizontal diameter of the eye is one-fifth or one-sixth of the length of the head, and not quite one-half of that of the snout. The interorbital space is flat, scaly, and its width equals the vertical diameter of the orbit (in mature specimens). Dorsal fins close together, lower than the body; the distance of the first dorsal from the eye is more than that of the snout from the præoperculum: the upper pectoral rays silk-like: the ventral fin has the basal membrane well developed, and provided with a lobe on each side; it terminates at a great distance from the vent. Streaks of minute warts are scarcely visible on the side of the head. Brownish, marbled with darker; a series of black dots along the middle of the side; the first dorsal clouded with blackish, the second, caudal and pectoral dotted with brown; anal and ventral immaculate.

Mediterranean. (? Black Sea.)

a. Adult. Bay of Naples. Presented by S. P. Pratt, Esq.
b. Fine specimen. Mediterranean. Presented by Prof. Troschel.
c. Half-grown. Mediterranean.
d, *e*, *f*. Adult and half-grown.
g, *h*. Adult: skeletons.

Skeleton.—The skull is rather short, as in *Batrachus*; its crown is flattened, slightly elevated along the median line, which terminates in a short and low occipital crest. The lateral and anterior margins of the crown (parietal and principal frontal bones) are provided with a double ridge, including a muciferous channel; the outer anterior angle of the crown is produced into a point which projects into the orbit. The orbit is on the upper surface of the head, inclining downwards to the side, and not closed by an infraorbital ring. The orbital portion of the frontal bone is very narrow. The præfrontal is moderately developed, and has a rudimentary præorbital attached to it. The ethmoid forms a portion of the upper surface of the skull: the intermaxillary is dilated into an oblong lamella posteriorly; the maxillary is styliform, curved and scarcely dilated at its extremity. The dentary bone is strong, bent inwards to meet its fellow, but not upwards, as in *Gobius giuris*; the articular bone is dilated, not extending very far forwards; the angular bone is completely united with it, no suture between them being visible. Vomer hammer-like; palatine and pterygoid bones styliform. The tympanic bones are narrow, and large portions of the tympanic groove are unossified: the hypotympanic is formed by two portions—the upper broad one for the sutures with the pterygoids and with the præ- and meso-tympanic, the lower for the suture with the præoperculum. There is a wide free space between these two portions, posteriorly closed by the mesotympanic and the præoperculum; the mesotympanic is of about the same size as the prætympanic. The glossohyal is extremely broad, triangular, the point of the triangle being posterior; the urohyal is irregularly quadrangular. The humeral arch is fixed to the skull by the suprascapula, which terminates superiorly in two long styliform processes, the lower of which is extremely slender. There is a transverse groove formed by two ridges near the point where these two processes meet; it serves as the passage for the muciferous channels of the head into that of the lateral line. The humerus has a short process posteriorly for articulation with the pubic bone of its side; radius very short and intimately united with the humerus. Each pubic bone, if viewed from above, is concave anteriorly and convex posteriorly; there is a cartilage intermediate between humerus and pubic bone.

The posterior portion of the occipital bone is somewhat produced backwards; there are twelve abdominal and sixteen caudal vertebræ, the length of the former portion of the vertebral column being to that of the caudal as 1 : 1·3. The ribs are moderately strong, provided with long epipleurals. Neural, hæmal, &c. spines feeble.

109. Gobius maderensis.

Gobius madeirensis, *Cuv. & Val.* xii. p. 55.
—— niger, var., *Lowe, Proc. Zool. Soc.* 1839, p. 84, and *Trans. Zool. Soc.* iii. p. 10.

D. 6 | $\frac{1}{13}$. A. $\frac{1}{11}$. L. lat. 54.

Fourteen longitudinal series of scales between the second dorsal and the anal fins. Head rather broader than high. The height of the body is contained six times in the total length, the length of the head four times and a half. The snout is somewhat longer than the eye, the interorbital space exceedingly narrow. The dorsal fins are somewhat remote from each other, and lower than the body; the distance of the first dorsal from the eye equals that of the snout from the præoperculum; several stripes of minute warts radiate from the lower part of the orbit; nape of the neck without warts. The upper pectoral rays silk-like; the ventral has the basal membrane very broad, and does not extend on to the vent. Brownish-black or blackish, with inconspicuous darker cross-bars; fins black.

Sea of Madeira.

a–b, c, d–f, g. Madeira.
h. Adult. Light-coloured variety.

110. Gobius ekströmii.

Gobius minutus, *Ekstr. Vet. Akad. Handl.* 1834, p. 64, and *Fische in den Scheeren von Mörkö*, p. 260 (not *Gm., Cuv., &c.*).

D. 6 | $\frac{1}{13}$. A. $\frac{1}{11}$. L. lat. 60.

The height of the body is contained six times and a quarter in the total length, the length of the head four times. The head is as broad as high, and not quite twice as long as broad. The horizontal diameter of the eye is one-fifth of the length of the head, and much less than that of the snout. The interorbital space is very narrow. The dorsal fins are rather remote from each other, and somewhat lower than the body; the distance of the first dorsal from the eye is more than that of the snout from the præoperculum. The posterior dorsal rays are not longer than the anterior ones. None of the pectoral rays silk-like; the ventral extends to the vent. Transparent yellowish, marbled with reddish; five or six dark-brown spots along the lateral line, that at the base of the caudal being the most distinct; the anterior dorsal with a blackish spot posteriorly; the other vertical fins dotted with brownish.

Coasts of Scandinavia.

a. Adult. River Gotha, Sweden. Taken from the stomach of a *Cottus scorpius.*

This species is very similar to *Gobius minutus,* with which it has been confounded by Ekström, but may be readily distinguished by the greater number of the rays of the dorsal and anal fins.

	lines.
Total length	28
Height of the body	4½
Length of the head	7
Greatest width and height of the head	4
Diameter of the eye	1½

111. **Gobius minutus.**

The Spotted Goby. The Polewig.
Aphya, *Rondel.* vii. c. 3. p. 210.
Aphya cobitis, *Willughby,* p. 207. pl. 12. fig. 5.
Marsio, *Ray,* p. 76.
Gobius, sp. ✠, *Artedi, Genera,* p. 29 (part. descr.), and sp. 4, *Synon.* p. 47 (part. synon.).
Gobius aphya, *L. Syst. Nat.* i. p. 450 (part.); *Artedi, ed. Walb.* iii. p. 192; *Bl. Schn.* p. 70; *Risso, Eur. Mérid.* iii. p. 281 (not *Ichth. Nice*).
Gobius, no. 276, *Gronov. Zoophyl.* i. p. 81.
Spotted Goby, *Penn. Brit. Zool.* iii. p. 187. tab. 37.
Buhotte, *Duhamel, Pesches,* part. 2. sect. 6. pl. 3. fig. 3.
Gobius minutus, *L. Gm.* i. p. 1199; *Lacép.* ii. p. 571; *Donov. Brit. Fishes,* ii. pl. 38; *Turton, Brit. Faun.* p. 94; *Flem. Brit. An.* p. 206; *Jen. Man.* p. 386; *Yarrell, Brit. Fishes,* 2nd edit. i. p. 288, 3rd edit. ii. p. 325; *Parn. Fishes of the Frith of Forth,* p. 82. pl. 29; *Cuv. & Val.* xii. p. 39; *Fries, Wiegm. Arch.* 1840, p. 237; *Nilss. Skand. Faun.* iv. p. 222; *Guichen. Exp. Algér. Poiss.* p. 78 (not *Pall.* or *Ekstr.*).
Eleotris minuta, *Bl. Schn.* p. 66.
Gobius quadrimaculatus, *Cuv. & Val.* xii. p. 44; *Guichen. Exp. Algér. Poiss.* p. 78.
—— unipunctatus, *Parn. Fishes of the Frith of Forth,* p. 83. pl. 29.
? Gobius leopardinus, *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 436, *Poiss.* pl. 13. fig. 4.

$$\text{D. } 6 \,\Big|\, \tfrac{1}{9\text{–}11}. \quad \text{A. } \tfrac{1}{9\text{–}10}. \quad \text{L. lat. } 60.$$

Fifteen longitudinal series of scales between the second dorsal and the anal fins. Head rather broader than high. The height of the body is nearly one-seventh of the total length, the length of the head one-fourth. The horizontal diameter of the eye is one-fifth of the length of the head, and less than that of the snout. The interorbital space is narrow and naked. The dorsal fins are rather remote from each other, and somewhat lower than the body; the distance of the first dorsal from the eye is more than that of the snout from the præoperculum. None of the pectoral rays silk-like; the ventral extends to, or nearly to, the vent. Transparent greyish or yellowish; back minutely dotted with black; sometimes several darker spots along the middle of the side; generally a black spot between the last two rays of the first dorsal fin.

Coasts of Europe.

a. Adult. Frith of Forth.—Named *Gobius arenarius* (?).
b, c. Adult and half-grown. Frith of Forth.
d. Adult. Frith of Forth.—Named *Gobius unipunctatus.*
e–k. Adult. Mouth of the Thames. Presented by J. Frembly, Esq.
l. Many specimens. Brighton. Presented by J. G. Children, Esq.
m–o. Adult and half-grown. South Devon. Collected by G. Montagu, Esq.
p–q. Adult. England. Presented by Mr. Moore.
r–s. Adult. Sicily. Presented by W. Swainson, Esq.
t, u–z, α, β–γ. Adult.

Parnell's assertion, that specimens with a spot on the first dorsal fin have two rays more in the anal fin than those without a spot, is not confirmed by my examination of numerous specimens. See also Thompson in Ann. & Mag. Nat. Hist. 1840, v. p. 9.

Gobius gracilis (Jenyns, Brit. Vert. p. 387; Yarrell, Brit. Fishes, 2nd edit. i. p. 290, 3rd edit. ii. p. 331; Parn. Fishes Frith of Forth, p. 85) appears to be a rather doubtful species. Small specimens deposited in the British Museum, and named *Gobius gracilis*, agree much more with young individuals of *Gobius niger* than with the descriptions given by Jenyns and Parnell. Jenyns probably examined young individuals of *G. minutus.* [See Thompson, Ann. & Mag. Nat. Hist. 1839, i. p. 356 and ii. p. 28.]

112. Gobius colonianus.

Gobius colonianus, *Risso, Eur. Mérid.* iii. p. 285; *Cuv. & Val.* xii. p. 51. pl. 345.

$$\text{D. } 6 \left| \tfrac{1}{10}. \quad \text{A. } \tfrac{1}{10}. \right.$$

The height of the body is one-sixth of the total length, the length of the head one-fourth; the depth of the head is three-fifths of its length, and its breadth one-half. The first dorsal fin is nearly twice as high as the second, and considerably higher than the body, but none of the rays are produced; none of the pectoral rays silk-like. Brownish, minutely dotted with black, the dots forming ill-defined spots on the sides; the first dorsal with a round, black, white-edged spot between the last two spines.

Coast of Nice.

113. Gobius banana.

Poisson de Roche, *Rochefort, Hist. Nat. Antilles,* pp. 188, 189 (fig. bad).
? Gobius tajasica, *Lichtenst. in Berl. Abhandl.* 1822, p. 273 (not *Marcgr.*).
Gobius banana, *Cuv. & Val.* xii. p. 103.

Gobius martinicus, *Cuv. & Val.* xii. p. 105; *Casteln. Anim. nouv. ou rares de l'Amér. du Sud, Poiss.* p. 26.

$$\text{D. } 6 \,\Big|\, \frac{1}{10}. \quad \text{A. } \frac{1}{10}. \quad \text{L. lat. } 60\text{–}66. \quad \text{Vert. } 11/15.$$

Nineteen longitudinal series of scales between the second dorsal and the anal fin. The extent of the snout is rather more than one-third of the length of the head. Eye small, one-seventh of the length of the head (in mature individuals); the height of the body is contained six times and a half in the total length, the length of the head four times and a fourth. The interorbital space is flat, and its width equals the diameter of the eye. The upper jaw is longer than the lower. The maxillary extends to the vertical from the orbit in immature specimens, or in specimens of middle size; it does not reach so far backwards in very large individuals. Scales on the nape much smaller than those on the sides. The distance of the first dorsal from the eye is equal to, or rather more than, that of the snout from the præoperculum. The ventral terminates at a great distance from the vent, and has the basal membrane very broad. Dorsal fins lower than the body. Brownish-olive, irregularly spotted or dotted with dark brown; sometimes two oblique streaks from the eye to the lip. Dorsal, caudal, and pectoral fins dotted with brown, the dots forming waving longitudinal stripes on the dorsals, and transverse streaks on the caudal and pectoral. Mature specimens have six to eight dotted streaks on the caudal, immature ones four to five. Ventrals and anal white.

Caribbean Sea, entering fresh waters.

a–i. Adult and half-grown: stuffed and skins. Caribbean Sea. From Dr. Parnell's Collection.
k–t. Adult and young. Caribbean Sea. From the Collection of the Zoological Society.
u, v. Adult. Antilles. Purchased of Mr. Brandt.
w–y. Half-grown: skins, in spirit. America. From Dr. Parnell's Collection.
z. Thirteen inches long. From the Haslar Collection.
α. Adult.
β. Adult: skeleton. Caribbean Sea. From the Collection of the Zoological Society.

Skeleton.—It does not differ in any essential point from those of *G. giuris* and *G. capito*, but is distinguished by the following peculiarities:—

The crown of the head is broad, as in other Gobies, but with the whole surface slightly convex. The posterior processes of the intermaxillaries are long and broad, and the anterior portion of these bones is horizontally dilated, as in other Acanthopterygians which have a protractile mouth (as *Gerres*). The bones of the jaws in general are rather slender, and the articulary of the mandibula is not dilated. Pubic bones short. There are eleven abdominal and fifteen caudal vertebræ, the length of the former portion of the vertebral column being to that of the caudal as 1 : 1·3. Ribs and processes of the vertebræ feeble.

114. Gobius æneo-fuscus.

Peters in Monatsber. Berl. Acad. 1852, p. 681.

D. $6 \mid \frac{1}{10}$. A. $\frac{1}{10}$. L. lat. 60.

Sixteen longitudinal series of scales between the second dorsal and the anal fin. The extent of the snout is one-third of the length of the head. Eye small, one-seventh of the length of the head. The height of the body is contained five times and three-fourths in the total length, the length of the head four times and a half. The interorbital space is flat, and its width equals the diameter of the eye. Teeth in a very narrow band in the upper jaw. The upper jaw is longer than the lower, and the maxillary does not extend to the vertical from the orbit. The distance of the first dorsal from the eye is considerably more than that of the snout from the præoperculum. Scales on the nape much smaller than those on the sides. The ventral terminates at a great distance from the vent, and has a broad basal membrane. Dorsal fins lower than the body. Ground-colour green on the back, with metallic reflexions on the sides, irregularly spotted and dotted with dark brown; two oblique streaks from the eye to the lip; dorsal and caudal rays with brown dots, forming longitudinal stripes on the former, and transverse ones on the latter; ventrals and anal white.

Coast of Mozambique.

a. Four and a half inches long. Sena. From Prof. Peters's Collection.

This species is so closely allied to the West Indian *G. banana*, that it requires a very close examination to detect differences by which both may be distinguished, whilst, on the other hand, it is very distinct from the East Indian *G. grammepomus*. Its most characteristic feature appears to be the snout, which is comparatively shorter than in *G. banana*; yet some specimens of the latter approach it very closely also in this respect.

115. Gobius mexicanus.

D. 6 | 11. A. 11. L. lat. 76–82.

Twenty-four series of scales between the second dorsal fin and the anal. The height of the body is contained seven times and a half in the total length, the length of the head four times and four-fifths. The head is flat superiorly, as broad as high, its width being nearly one-half of its length. Snout elongate, with the upper profile oblique; cleft of the mouth horizontal, the upper jaw being rather the longer. Canine teeth none; teeth of the outer series enlarged. The maxillary extends to the vertical from the anterior margin of the eye. The width of the interorbital space equals the diameter of the eye, which (in mature specimens) is one-eighth of the length of the head. The head is naked; scales ctenoid, those on the nape and on the anterior part of the body very small. The distance of the first dorsal from the eye is more than that of the snout from the præoperculum. The dorsal fins are lower than the body; none of the spines produced: caudal rounded, one-eighth of the total length: the ventral terminates at a great distance from the anus, and has a very broad basal membrane. Yellowish-olive: back and sides reticulated with blackish; head, dorsal, caudal and pectoral fins dotted with blackish, the dots on the second dorsal forming interrupted zigzag streaks; six cross-series of dots on the caudal; an irregular, small blackish spot on the upper part of the root of the pectoral; ventral and anal fins and the whole belly yellowish-white.

Mexico.

a, b. Fine specimens. Mexico. From M. Sallé's Collection.

	inches.	lines.
Total length	8	0
Height of the body	1	1
Length of the head	1	8
Greatest width of the head	0	11
Diameter of the eye	0	2½
Length of the caudal fin	1	0

Closely allied to *Gobius banana,* but readily distinguished by the smaller scales.

116. Gobius transandeanus.

D. 6 | 11. A. 10–11. L. lat. 66–68.

Fifteen longitudinal series of scales between the second dorsal fin and the anal. The height of the body is contained seven times in the total length, the length of the head three times and three-fourths; the head is flat, depressed, much broader than high, with the snout elongate. Cleft of the mouth nearly horizontal, the upper jaw being the longest. Canine teeth none; teeth of the outer series enlarged. The maxillary extends to the vertical from the anterior margin of the eye. The width of the interorbital space equals the diameter of the eye, which (in mature specimens) is one-fifth or one-sixth of the length of the head. The head is naked; scales ctenoid, on the nape and on the anterior part of the body very small. The distance of the first dorsal from the eye is considerably less than that of the snout from the præoperculum. The dorsal fins are higher than the body, and the spines of the anterior dorsal are prolonged into free filaments (in mature specimens); caudal rounded, one-fifth of the total length; the ventral terminates at a great distance from the anus, and has a very broad basal membrane. Yellowish: head, body, dorsal and caudal fins irregularly spotted with blackish; anal and ventral uniform white or blackish.

Fresh waters of Western Ecuador.

a–b, c–d. Fine specimens. Western Ecuador. From Mr. Fraser's Collection.

	lines.
Total length	62
Height of the body	9
Length of the head	17
Greatest width of the head	10
Diameter of the eye	$2\frac{1}{2}$
Length of the caudal fin	12

The western representative of *Gobius banana* and *G. mexicanus*. The most constant markings appear to be some oblique blackish streaks on the side of the snout, and a similar streak across the upper part of the root of the pectoral.

117. Gobius crassilabris.

D. 6 | 11. A. 11. L. lat. 60.

Fifteen longitudinal series of scales between the second dorsal fin and the anal. Scales on the neck much smaller than those on the tail. The height of the body is contained six times and a half in the total length, the length of the head three times and a half. The head is flat, depressed, as broad as high, with the snout elongate. Cleft of the mouth horizontal, the upper jaw being the longer; lips thick; the eye is situated in the middle of the length of the head. All the teeth small; none of the outer series enlarged. The maxillary extends to, or slightly beyond, the vertical from the anterior margin of the eye. The width of the interorbital space equals the diameter of the eye, which (in mature specimens) is one-sixth of the length of the head. The head is naked; scales on the anterior part of the body smaller than on the posterior. The distance of the first dorsal fin from the eye equals that of the snout from the præoperculum. The dorsal fins are lower than the body; caudal rounded, its length being somewhat less than one-fifth of the total; the ventral fin terminates at a great distance from the anus, and has a broad basal membrane. Yellowish or brownish: sides of the head and body with irregular black spots, the spots forming a distinct longitudinal band between the bases of the pectoral and caudal fins; root of the caudal with a round deep-black spot; a black streak superiorly on the base of the pectoral. Dorsal, caudal, and pectoral fins dotted with brown, the dots being arranged in longitudinal series on the first, and in transverse ones on the two latter; ventral and anal blackish.

Fresh waters of Oualan and Aneiteum.

a. Adult. Oualan. Voyage of the 'Herald.'
b, c. Fine specimens. Aneiteum. From Mr. Macgillivray's Collection.

	lines.
Total length	64
Height of the body	10
Length of the head	17
Greatest width of the head	9

118. **Gobius ocellaris.**

Gobius ocellaris, (*Brouss.*) *Cuv. & Val.* xii. p. 98.

$$D.\ 6 \left| \frac{1}{10}. \quad A.\ \frac{1}{10}. \quad L.\ lat.\ 60. \right.$$

Snout elongate, with the upper jaw longest and somewhat protractile. The height of the body is one-fifth of the total length, the length of the head one-fourth; the height of the latter is two-thirds of its own length, and its width three-quarters of its height. The eye is situated nearer to the extremity of the operculum than to that of the snout, and is one-sixth of the length of the head, or one-half of the width of the interorbital space. All the teeth are small, villiform. The height of the vertical fins is one-half of that of the body; caudal rounded; the basal membrane of the ventrals is broad, without lateral appendages. Reddish-brown, sometimes with a darker band along the middle of the body; back and sides dotted with black; fins blackish: the anterior dorsal with a black spot between the fifth and sixth spines; the posterior and the caudal with stripes of black dots. (*Val.*)

Fresh waters of Ile de France (and of Otaheiti?).

119. **Gobius grammepomus.**

Gobius grammepomus, *Bleek. Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* p. 34, and *Batjan*, ii. p. 200.
—— melanocephalus, *Bleek. Verhand. Batav. Genootsch. l. c.* p. 33.
—— personatus, *Bleek. l. c.* p. 34, and *Natuurk. Tydschr. Nederl. Ind.* 1851, i. fig. 4.

$$D.\ 6 \left| \frac{1}{10}. \quad A.\ \frac{1}{10}. \quad L.\ lat.\ 50–55. \right.$$

The height of the body is contained five times and a half to seven times and a half in the total length, the length of the head four times to four times and two-thirds; the height of the head equals its width, and is contained once and a half or once and three-quarters in its length. The snout is slightly convex, longer than the eye; the diameter of the latter is one-fourth or one-fifth of the length of the head. The cleft of the mouth is very slightly oblique, with the upper jaw longer; the teeth of the outer series somewhat enlarged; canine teeth none. The maxillary extends to the vertical from the orbit. Head naked. Scales on the neck not much smaller than those on the tail. The spinous dorsal is somewhat higher than the soft, but lower than the body; the second and third spines are the longest; none of the pectoral rays silk-like; caudal rounded, its length being five times or five times and a half in the total. Green, brown-spotted; head dotted with violet; an oblique streak from the eye to the maxillary; dorsal and caudal fins with small, oblong, curved black spots; pectoral with a larger spot at the upper part of the base; anal yellowish, violet along the middle.

Rivers of Java, Celebes, Borneo, Bali, Booroo, Amboyna, Sumatra, and Batjan; Ceylon; Madras.

a–b, c–d. Fine specimens. Ceylon.

e. Adult: bad state. Madras. Presented by T. C. Jerdon, Esq.
f–g. Fine specimens. Borneo. Purchased of Mr. Frank.
h. Adult.

120. Gobius gymnopomus.

Bleeker, Sumatra, ii. p. 270.

$$\mathrm{D.}\ 6 \left|\ \frac{1}{10}.\right. \quad \mathrm{A.}\ \frac{1}{10}. \quad \mathrm{L.\ lat.}\ 46\text{–}50.$$

The height of the body is contained six times and three-quarters in the total length, the length of the head five times and one-third. The head is higher than broad, its width being one-half of its length. The width of the interorbital space is one-half the diameter of the eye, which is contained three times and two-thirds in the length of the head. Crown of the head scaly, its sides naked. The teeth of the outer series are enlarged; canine teeth none. Jaws equal anteriorly. The anterior dorsal is about as high as the body, the second and third spines being the longest; the posterior part of the second dorsal higher than the body; caudal rounded. Green, spotted with brown: three brown angular cross-bands between the back and the anal fin, the angle being directed backwards; a brown cross-band below the eye. The anterior dorsal violet with a yellow longitudinal band, and with yellow dots above it; the posterior spotted with yellow, and with a yellow line along the margin; pectorals yellow, with a black spot on the upper part of the base; ventrals violet; anal with an orange-coloured line along the margin; caudal spotted with green superiorly and with a yellow and reddish-violet margin. (*Bleek.*)

Seas of Priaman and Java.

121. Gobius brunneus.

Schleg. Faun. Japon. Poiss. p. 142. pl. 74. fig. 2.

D. 6 | 10. A. 8.

The height of the body is about one-sixth of the total length, the length of the head one-fourth. The snout is moderately long, its length being three times and a half in that of the head; the cleft of the mouth oblique, with the lower jaw prominent. Teeth very small; scales of moderate size. Caudal rounded; the second and third dorsal spines are the longest, lower than the body. Dark brown: back and all the fins dotted with blackish; the first dorsal with two broad brown bands. (*Schleg.*)

Bay of Nagasaki.

122. Gobius annularis.

Chænogobius annularis, *Gill in Ann. Lyc. Nat. Hist. New York,* vii. 1859, p. 12.

D. 6 | 9. A. 8.

Scales small, cycloid; head and sides of the neck naked. Body elongate, its height being one-seventh, and the length of the head nearly one-fourth of the total; head rather broader than high, and nearly twice as long as high. The cleft of the mouth is slightly oblique, with the jaws equal anteriorly; canine teeth none. The diameter of the eye is one-fourth of the length of the head, and twice the width of the interorbital space. Dorsal fins not elevated; caudal rounded. Brownish-grey, superiorly minutely dotted with blackish; several ocelli near the vent; the second dorsal with three bands. (*Gill.*)

Coast of Jesso.

123. **Gobius xanthozona.**

Bleeker, Verhand. Batav. Genootsch. xxii., *Blenn. en Gob.* p. 34.

D. $6 \mid \frac{1}{8}$. A. $\frac{1}{8}$. L. lat. 50.

The height of the body is contained five or six times in the total length, the length of the head three times and a half; the head is somewhat higher than broad; the width of the interorbital space is more than the length of the diameter of the eye, which occupies the second fifth of the length of the head. Teeth of the outer series in the upper jaw enlarged; canine teeth none. Cleft of the mouth subvertical. Dorsal fins lower than the body; caudal rounded. Body encircled by eight alternately black and yellow bands, the first across the head, and the fourth black one across the base of the caudal fin; dorsal and anal fins entirely black; the others yellow, with the base black. (*Bleek.*)

Rivers of Java and Borneo, near the coast.

124. **Gobius platynotus.**

D. 6 | 9. A. 10. L. lat. 65.

Twenty longitudinal series of scales between the origin of the posterior dorsal fin and the anal. Head and anterior part of the body broad, somewhat depressed; a deep groove along the median line of the broad back. The height of the body is contained six times and a half in the total length, the length of the head four times and a half. Head broader than high, and not much longer than broad; snout broad, somewhat longer than the diameter of the eye, with the upper jaw slightly overlapping the lower; the cleft of the mouth extends to below the middle of the eye. Teeth villiform; canines none. The diameter of the eye is one-fifth of the length of the head, and somewhat less than the width of the interorbital space. Head naked, except the posterior portion of the operculum; two longitudinal stripes of minute warts on the cheek. Dorsal fins lower than the body, the anterior being lower than the posterior; the third and fourth dorsal spines are the longest. Caudal rounded, its length being six times and a half in the total length. The pectoral has no silk-like rays, and does not extend to the vertical from the vent: ventral rather short, not adherent to the belly, terminating at a great distance from the vent; its basal membrane is well developed. Scales small, cycloid. Brown (in spirits), with some darker dots; a black spot on the posterior part of the spinous dorsal; the soft dorsal with blackish spots; the other fins immaculate.

	lines.
Total length	23
Length of the head	5
Height of the body	$3\frac{1}{2}$
Diameter of the eye	1
Length of the caudal fin	$3\frac{1}{2}$

Hab. ——?

a. Presented by Sir A. Smith.

bb. Canine teeth.

125. Gobius sphinx.

Cuv. & Val. xii. p. 93; *Bleek. Banda,* iii. p. 103.

D. $6 \mid \frac{1}{14}$. A. $\frac{1}{14}$. L. lat. 53.

The lower jaw is provided with a small canine tooth on each side. Eighteen longitudinal series of scales between the second dorsal and the anal fins. Head compressed, higher than broad. The height of the body is contained four times and a fourth in the total length, the length of the head four times and a half. The snout is obtuse, somewhat longer than the diameter of the eye; the interorbital space is flat, scaleless, and its width is one-half the diameter of the eye. Dorsal fins close together, lower than the body; the distance of the first dorsal from the eye is rather more than that of the snout from the præoperculum; none of the pectoral rays silk-like; the ventral has the basal membrane moderately developed, and does not extend on to the vent. Body with four or five brownish cross-bands; belly rose-coloured, with about twelve blue cross-streaks; head with numerous blue, darker-edged spots; the first dorsal clouded with violet and dotted with blue, like the second and the caudal. Ventral and anal fins rose-coloured, with black margin; the former entirely dotted with blue, the latter only posteriorly. Gill-membrane with a brown cross-bar.

Sea of New Guinea. East Indian Archipelago.

a. Fine specimen. Ceram. From Madame Ida Pfeiffer's Collection.
b. Fine specimen. Borneo. Purchased of Mr. Frank.

126. Gobius phalæna.

Cuv. & Val. xii. p. 92; *Bleek. Banda,* i. p. 244.

D. $6 \mid \frac{1}{14}$. A. $\frac{1}{14}$. L. lat. 52.

The lower jaw is provided with one or two small canines on each side. Sixteen longitudinal series of scales between the second dorsal and the anal fins. Head rather compressed, higher than broad. The height of the body is contained four times and three-fourths in the total length, the length of the head four times and a half. The snout is obtuse, nearly equal in length to the horizontal diameter of the eye; the interorbital space is flat, scaleless, and its width rather less than the vertical diameter of the eye. Dorsal fins close together, the third and fourth rays of the first dorsal elongate, filiform, as high as the body; the distance of the first dorsal from the eye is more than that of the snout from the præoperculum. None of the pectoral rays silk-like; the ventral has the basal membrane moderately developed, and extends to the origin of the anal. Brownish (in spirits), with six brown cross-bands, the posterior of which are lighter in the middle; side of the head with three series of rose-coloured, brown-edged spots. The first dorsal anteriorly with two oblique violet spots, posteriorly with a rounded blackish spot; the second dorsal blackish, with a whitish longitudinal band below its margin; caudal whitish, with blackish margin and three round black spots, one near the base on the superior portion, the other near the upper, and the third near the lower angle. Anal black, with two longitudinal series of light spots; ventrals blackish; pectoral colourless.

East Indian Archipelago; Vanicolo.

a. Adult. Amboyna. Purchased of Mr. Frank.

This specimen does not exhibit the bands across the belly, described by Valenciennes, and very distinct in *Gobius sphinx*.

127. Gobius semicinctus.

Bennett, Proc. Zool. Soc. 1833, i. p. 32.

D. $6 \,\Big|\, \frac{1}{15}$. A. $\frac{1}{14}$. L. lat. 55.

The lower jaw is provided with a small canine tooth on each side. Eighteen longitudinal series of scales between the second dorsal and the anal fins. Head rather compressed, higher than broad. The height of the body is contained four times and three-fourths in the total length, the length of the head five times. The snout is obtuse, scarcely longer than the horizontal diameter of the eye, which equals the width of the interorbital space. Jaws equal in length anteriorly; the upper maxillary does not quite extend to below the centre of the orbit. The interorbital space is naked; the scales on the neck are much smaller than those on the body. Dorsal fins close together, the second, third and fourth spines are much elongate, filiform, higher than the body; the distance of the first dorsal from the eye is more than that of the snout from the præoperculum. None of the pectoral rays silk-like; the ventral has the basal membrane moderately developed, and extends to the vent. Greenish-olive (in spirits), with some very indistinct darker bands across the back. The lower side yellowish, with six silvery cross-bands, edged with black, as broad as the interspaces of the ground-colour between them, and ascending as far as the middle of the side; the first is between the roots of the pectoral and ventral fins, the last two above the anterior half of the anal fin. Shoulder with a round brownish spot. Head reddish-olive; its sides with rather irregular, small, round silvery spots edged with brown. The first dorsal with a large violet spot in the middle and with numerous small ocelli; the second dorsal with longitudinal series of violet dots, more distinct on the base of the fin than superiorly; caudal with blackish margin and with a round blackish spot superiorly at its base; anal fin with numerous small ocelli along the base; pectoral without markings; ventral white, with the margin blackish.

Mauritius.

a. Five inches long. Type of the species. From the Collection of the Zoological Society.

128. **Gobius albomaculatus.**

Gobius albomaculatus, *Rüpp. Atl. Fische*, p. 135, and *N. W. Fische*, p. 137; *Peters in Wiegm. Arch.* 1855, p. 250.
—— quinqueocellatus, *Cuv. & Val.* xii. p. 95.

D. 6 | 14–15. A. 15–16. L. lat. 56.

Twenty longitudinal series of scales between the second dorsal fin and the anal. Crown of the head parabolic. The second, third and fourth dorsal spines produced into filaments, and higher than the body. Caudal rounded. Canine teeth in the lower jaw. Greenish-brown, with five umber-brown cross-bands, and with bluish spots between them on the back; opercles with four blue longitudinal streaks, and a yellow band between; a round blackish spot above the root of the pectoral and on the base of the caudal; the second dorsal white-dotted, and sometimes with three black, blue-edged ocelli at the base; two or three similar ocelli on the caudal fin.

Massuah.

a, b–c. Adult and half-grown. Red Sea. Collected and presented by Dr. E. Rüppell.

129. **Gobius decussatus.**

Bleeker, Celebes, vii. p. 442.

D. 6 | $\frac{1}{15}$. A. $\frac{1}{14}$. L. lat. 60–65.

The height of the body is contained six times and a half in the total length, the length of the head five times. Teeth of the outer series enlarged; two strong canines in the lower jaw; cleft of the mouth oblique. Dorsal fins rather lower than the body; caudal rounded. Greenish rose-coloured, with four orange-coloured longitudinal bands, crossed by bars of the same colour; head with two red longitudinal bands, edged with black and blue, the upper to the scapula, the lower to the pectoral. Tail with an orange-coloured, blue-edged spot. Dorsal and anal fins with oblique blue stripes. (*Bleek.*)

Coasts and rivers of Nias, Celebes, and Booroo.

130. Gobius bynoensis.

Gobius bynoensis, *Richards. Ichthyol. Ereb. & Terr.* p. 1. pl. 1. figs. 1, 2 (not good).
—— stethophthalmus, *Bleek. Natuurk. Tydschr. Nederl. Ind.* i. p. 249. fig. 7, and xv. p. 236.

$$\text{D. } 6 \,\Big|\, \frac{1}{16}. \quad \text{A. } \frac{1}{15}. \quad \text{L. lat. ca } 65.$$

The height of the body is contained five times and a half in the total length, the length of the head five times. Head higher than broad; snout obtuse; cleft of the mouth slightly oblique; teeth of the outer series enlarged; lower jaw with a pair of canine teeth. The width of the bony part of the interorbital space is one-half of the diameter of the orbit, which is one-fifth of the length of the head. The anterior dorsal is rather higher than the posterior, and lower than the body; its distance from the eye is more than that of the snout from the præoperculum. Caudal rounded; none of the pectoral rays silk-like. Body with two or three longitudinal bands: one through the base of the pectoral, forming a spot of deeper colour at the base of the fin; another from the snout through the eye, crossed by about five bars, descending from the back. Two series of brown specks from the crown of the head to the dorsal fin.

Coast of Western Australia; Philippine Islands. Biliton. Java.

a. Type of the species: not good state. From the Haslar Collection.
b. Half-grown. Australia. Presented by Sir J. Richardson.
c. Adult. Port Essington. Presented by the Earl of Derby.
d. Adult. Philippine Islands.

This is a beautiful species. Bleeker describes the colours, from fresh specimens, as follows:—

Greenish: back with four or five brownish-violet cross-bands; on each side of the head two brownish-violet, blue-edged longitudinal bands, the lower of which terminates in a dark spot on the upper part of the base of the pectoral; neck with two series of brown, blue-edged ocelli; dorsal fins dotted with white; caudal with a brown spot on the upper part of its base; anal with violet margin; the other fins rose-coloured.

C. Scales minute.

131. Gobius cæruleopunctatus.

Gobius cæruleopunctatus, *Rüpp. Atl. Fische*, p. 134, and *N. W. Fische*, p. 137. taf. 32. fig. 3.
—— pavoninus, (*Ehrenb.*) *Cuv. & Val.* xii. p. 112.

$$\text{D. } 6 \,\Big|\, \frac{1}{11}. \quad \text{A. } \frac{1}{9}.$$

Scales very small. The height of the body is contained six times in the total length, the length of the head four times and a half, that of the caudal four times; the latter is rhomboidal. The eyes are very close together, one-sixth of the length of the head. Snout short and obtuse. Canine teeth none. Dorsal fins higher than the body. Brownish, with pearl-coloured spots along the back, and with six or seven light streaks on the side, descending obliquely forwards; head and the anterior part of the back with round black, white-edged spots; similar but smaller spots between the rays of the dorsal fins; anal and pectoral spotted with white; caudal with a yellow and black margin.

Massuah.

a, b. Adult. Red Sea. From Dr. Rüppell's Collection.

132. Gobius cyanotænia.

Bleeker, Batavia, p. 475.

$$D.\ 6 \mid \tfrac{1}{10}.\quad A.\ \tfrac{1}{10}.\quad L.\ lat.\ 100.$$

The height of the body is contained seven times and a quarter in the total length, the length of the head four times and a half; the head is higher than broad; the snout obtuse, convex, shorter than the eyes, which are prominent, close together, one-fifth of the length of the head. The cleft of the mouth is oblique, the lower jaw being slightly the longer. The teeth of the outer series are enlarged; canine teeth none. Head naked; the scales of the anterior part of the body smaller than those of the posterior. The first dorsal fin is somewhat higher than the second, but lower than the body. None of the pectoral rays silk-like; caudal rounded. Greenish rose-coloured, with four broad brownish cross-bands and eleven blue transverse stripes; sides of the head with oblique blue streaks; dorsal, caudal, and ventral fins immaculate; base of the pectoral dotted with blue; anal yellow, with violet margin, and with three reddish-violet, blue-edged longitudinal bands. (*Bleek.*)

Sea of Batavia.

133. Gobius niveatus.

Cuv. & Val. xii. p. 107.

$$D.\ 6 \mid \tfrac{1}{11}.\quad A.\ \tfrac{1}{10}.$$

Scales very small. The height of the body is contained ten times and a half in the total length, the length of the head six times. The head is half as high as long. Snout obtuse, rounded. The second dorsal is higher than the first, and both are higher than the body. The length of the caudal is one-fourth of the total. Greyish-brown; the sides of the head and the lower parts dotted with white. All the fins with brown spots on the rays. (*Val.*)

Java.

134. Gobius cryptocentrus.

Cuv. & Val. xii. p. 111. pl. 346.

$$D.\ 6 \mid \tfrac{1}{10}.\quad A.\ \tfrac{1}{9}.$$

Scales small. The height of the body equals the length of the head and of the caudal fin, and is one-fifth of the total. The head is half as broad as long, and its height is three-fifths of its length. Snout short, convex; eyes close together. The upper jaw has an outer series of stronger teeth, and the two middle ones are somewhat longer than the others. The height of the dorsal fins does not exceed that of the body; caudal rhomboidal.

In spirits: blackish-brown, with numerous paler vertical streaks; sides of the head and the anterior portion of the back dotted with white. Dorsal fins greyish, with transparent spots, some of which have a black centre.

During life: greyish-red, with the vertical streaks yellow and the dots blue; cheek with three red, blue-edged vertical stripes. (*Val.*)

Massuah (Red Sea).

135. Gobius russus.

Cantor, Catal. p. 186.

$$\text{D. } 6 \Big| \tfrac{1}{10}. \quad \text{A. } \tfrac{1}{10}.$$

Scales exceedingly small. The height of the body is contained seven times in the total length, the length of the head and of the caudal fin four times and a half. The diameter of the eye is one-fourth of the length of the head, and nearly equal to that of the snout; the snout is broad, rounded, with the lower jaw a little longer than the upper; the gape wide, oblique; a small canine tooth on each side of the lower jaw; teeth of the outer series enlarged. Head and nape naked. Dorsal fins as high as the body; caudal somewhat pointed. Flesh-coloured: on each side four or five large clouded blackish spots, the scales of which have a minute, vertical, lanceolate whitish spot in the centre; the first dorsal whitish, with two blackish bands, and with a black spot between the fourth and fifth spines; the second dorsal with indistinct clouded blackish spots; the other fins whitish, minutely dotted with brown.

Sea of Pinang.

a. Type of the species: skin: not good state. From Dr. Cantor's Collection.

136. Gobius voigtii.

Gobius voigtii, *Bleeker, Sumatra*, iv. p. 83.
—— xanthotænia, *Bleeker, Celebes*, viii. p. 308.

$$\text{D. } 6 \Big| \tfrac{1}{10}. \quad \text{A. } \tfrac{1}{10}. \quad \text{L. lat. } 80.$$

The height of the body is contained seven times in the total length, the length of the head four times and four-fifths; the head is higher than broad; the snout convex, shorter than the eyes, which are very close together, one-fourth of the length of the head. The cleft of the mouth is oblique, with the jaws nearly equal; the teeth of the outer series are enlarged; a pair of lateral canine teeth in the lower jaw. Head and neck naked; scales on the anterior half of the body smaller than on the posterior. The first dorsal is much higher, the second lower, than the body; the length of the caudal fin is four times and a quarter in the total. Greenish, with eight brownish cross-bands; head with round blue, darker-edged spots; the first dorsal spine broadly annulated with brown, a black spot between the fourth and fifth spines; the second dorsal fin blue-spotted, and with a blue longitudinal line near the margin; caudal orange-coloured, superiorly and inferiorly violet, superiorly with two oblique blue streaks; the other fins violet.

Coasts of Celebes, Nias, Sumatra, and New Holland.

a. Adult.
b. Adult. New Holland.
c–d. Adult. Port Essington. From the Haslar Collection.

Bleeker describes the colours of the specimen, which he previously named *Gobius xanthotænia*, as follows:—Greenish, with four black spots on the back, and four others on the side; nine or ten oblique bright-yellow streaks on the body, descending forwards; head with golden, blue-edged ocelli: dorsal fins with the margin orange-coloured, the first spotted with yellow and reticulated with blue, and with a blackish spot between the third and fifth spines; anal with a series of round yellow spots along the base; caudal fin with a red and blue longitudinal streak along the middle, and with the upper margin yellow, blue, and orange coloured.

137. **Gobius polyophthalmus.**

Bleeker, Batavia, p. 474.

$$\mathrm{D.}\ 6 \left|\ \frac{1}{10}.\right.\quad \mathrm{A.}\ \frac{1}{10}.\quad \mathrm{L.\ lat.}\ 85.$$

The height of the body is contained seven times and three-quarters in the total length, the length of the head five times; the head is somewhat higher than broad; the snout obtuse, convex, shorter than the eyes, which are very close together, and one-fourth of the length of the head. The teeth of the outer series are enlarged, and the lower jaw is provided with two canines besides. Head naked; scales small, those on the anterior part of the body inconspicuous. The dorsal fins are scarcely higher than the body; caudal lanceolate, its length being contained three times and a half in the total. Greenish, with eight yellow cross-bands; three violaceous spots on the posterior part of the side; head and dorsal fins with numerous vermilion, blue-edged spots; the second dorsal with a yellow, blue and vermilion margin; caudal with oblique blue and vermilion streaks, and with the upper margin coloured as in the second dorsal; anal with a series of violet spots along the middle, and with the lower margin violet and yellow; pectorals orange-coloured; ventrals violet. (*Bleek.*)

Sea of Batavia.

138. **Gobius knutteli.**

? Gobius filifer, *Cuv. & Val.* xii. p. 106.
Gobius knutteli, *Bleek. Act. Soc. Sci. Indo-Nederl.* iii., *Japan*, p. 16. tab. 1. fig. 2.

$$\mathrm{D.}\ 6 \left|\ \frac{1}{10}.\right.\quad \mathrm{A.}\ \frac{1}{9}.$$

Scales minute. The height of the body is contained eight times in the total length, the length of the head four times and four-fifths. The head is higher than broad; the snout convex, longer than the eye, the diameter of which is one-fourth or one-sixth of the length of the head. Eyes close together; head and nape of the neck naked. The cleft of the mouth is oblique, wide, extending to the posterior margin of the eye. Teeth of the outer series enlarged; lower jaw with small canine teeth. The first dorsal is twice as high as the body; caudal somewhat elongate; none of the pectoral rays silk-like. Greenish, with six darker cross-bands; sides of the head with white, darker-edged ocelli; the spinous dorsal with a white cross-band and with a black spot between the first and second spines; the soft dorsal with three or four undulated white longitudinal streaks; the other fins immaculate.

Chinese and Japanese Seas.

a, b. Adult. China. Presented by J. R. Reeves, Esq.
c–d. Adult. Hongkong. From the Haslar Collection.

139. **Gobius arabicus.**

Gobius anguillaris, *Forsk.* pp. 23 & 24 (not *L.*).
—— arabicus, *L. Gm.* i. p. 1198; *Bl. Schn.* p. 72; *Rüpp. N. W. Fische,* p. 139.
—— bimaculatus, (*Ehrenb.*) *Cuv. & Val.* xii. p. 108.

$$\text{D. } 6 \left| \tfrac{1}{12}. \quad \text{A. } \tfrac{1}{11}. \right.$$

Scales very small. The height of the body is contained seven times in the total length, the length of the head four times and a half. Cheeks swollen; head as broad as high, but one-third longer than high. The eye occupies the second fifth of the length of the head. Canine teeth in the upper and lower jaws. The second and third dorsal spines are higher than the body; caudal pointed, one-fifth of the total.

In spirits: blackish; below paler, with brown cross-bands, or brownish with minute black dots; two blackish spots above the pectoral. The first dorsal with series of black points, the second with fine longitudinal lines; the other fins blackish; the caudal with the upper margin whitish.

During life: bluish-green, with red and blue dots; two oblong blue spots above the pectoral.

Red Sea.

a. Adult. Red Sea. Collected and presented by Dr. E. Rüppell.

140. **Gobius fontanesii.**

Bleeker, Celebes, iii. p. 764.

$$\text{D. } 6 \left| \tfrac{1}{15}. \quad \text{A. } \tfrac{1}{16}. \quad \text{L. lat. } 90. \right.$$

The height of the body is one-ninth or one-tenth of the total length, the length of the head one-sixth; the head is twice as long as high; the snout convex, obtuse, shorter than the eye; the cleft of the mouth oblique; teeth of the outer series enlarged. The eyes are very close together, one-fourth of the length of the head. The scales on the posterior part of the body are much larger than those on the anterior. Dorsal fins higher than the body; caudal rather elongate, its length being two-ninths of that of the body. Body reddish-brown, with three broad brown cross-bands, the first below the spinous dorsal fin, the two others below the soft; head with yellow dots superiorly; the soft dorsal with a series of yellow spots along the base. (*Bleek.*)

Sea of Bulucumba (Celebes); Amboyna.

141. **Gobius gymnocephalus.**

Bleeker, Batavia, p. 473.

$$\text{D. } 6 \left| \tfrac{1}{19}. \quad \text{A. } \tfrac{1}{19}. \right.$$

Scales very small. The height of the body is contained eight times or eight times and three-quarters in the total length, the length of the head six times; the head is rather higher than broad; the snout obtuse, shorter than the eye; the cleft of the mouth oblique; the eyes are close together, and their diameter is contained four times and a half in the length of the head. Canine teeth in both jaws. Dorsal fins nearly as high as the body; caudal lanceolate, its length being three times and two-thirds or four times and a quarter in the total; none of the pectoral rays silk-like. Greenish, with three broad rose-coloured cross-bands; dorsal fins immaculate; caudal with several oblique red and blue streaks; anal with a red and blue longitudinal band along the middle. (*Bleek.*)

Sea of Batavia.

II. The anterior dorsal with seven to nine spines.

142. **Gobius petrophilus.**

Bleeker, Batavia, p. 476.

$$\text{D. } 7 \left| \tfrac{1}{9}. \quad \text{A. } \tfrac{1}{8}. \quad \text{L. lat. } 35. \right.$$

The height of the body is contained six times and a third in the total length, the length of the head four times; head broader than high; snout convex, shorter than the eye; cleft of the mouth oblique. The diameter of the eye is contained three times and three-quarters in the length of the head; the width of the interorbital space is less than one-half of the diameter of the eye. Teeth of the outer series enlarged; canine teeth none. Head naked; scales on the neck smaller than those on the body. The first dorsal is half as high as the body; caudal rounded. Brownish-red, clouded with brown superiorly; the first dorsal with three or four brown longitudinal streaks; the rays of the other vertical fins and of the pectorals dotted with brown. (*Bleek.*)

Seas of Java, Bali, Sumatra, Timor, and Goram.

143. Gobius ruthensparri.

Gobius ruthensparri, *Euphras. Nya Handl. Stockh.* 1786, p. 64; *Retz. Faun. Suec.* p. 326; *Fries in Wiegm. Arch.* 1840, p. 237; *Cuv. & Val.* xii. p. 48; *Yarrell, Brit. Fishes,* 2nd edit. i. p. 285; *Nilss. Skand. Faun.* iv. p. 226.
—— minutus, *Nilss. Prodr.* p. 94.
—— niger, *Donov. Brit. Fishes,* v. pl. 104; *Flem. Brit. An.* p. 206.
—— bipunctatus, *Yarrell, Brit. Fishes,* 1st edit. i. p. 255; *Jen. Man.* p. 386; *Parn. Fishes Frith of Forth,* p. 86. pl. 29.

$$D.\ 7 \left|\ \frac{1}{10}.\right.\quad A.\ \frac{1}{11}.\quad L.\ lat.\ 35\text{–}40.$$

Eleven longitudinal series of scales between the second dorsal and the anal fins. Head as broad as high, with the snout short and obtuse. Body moderately slender; the interorbital space is very narrow and scaleless. Dorsal fins rather remote from each other, lower than the body; the distance of the first dorsal from the eye is more than that of the snout from the præoperculum. None of the pectoral rays silk-like; the ventral has the basal membrane well developed, and extends nearly to the vent. A deep-brown spot on each side of the root of the caudal fin, another above the base of the pectoral.

German Ocean. British Channel.

a, b. Many specimens. Falmouth. Presented by W. C. Cocks, Esq.
c–d. Adult: bad state. Polperro. Presented by J. Couch, Esq.
e–h. Adult. Berwick.
i–k. Adult. Presented by Dr. Johnston.

144. Gobius stigmothonus.

Richards. Voy. Sulph. Ichthyol. p. 147.

$$D.\ 9 \left|\ \frac{1}{13\text{–}14}.\right.\quad A.\ \frac{1}{11\text{–}12}.\quad L.\ lat.\ 60.$$

Teeth of the outer series enlarged; eyes about half the diameter of the orbit apart. A series of six very irregular dark marks on the middle of the sides, and a round black spot on the base of the caudal. A velvet-black mark occupies the upper half of the dorsal between the third and sixth spines. (*Richards.*)

Canton.

145. Gobius flavimanus.

Gobius flavimanus, *Schleg. Faun. Japon. Poiss.* p. 141. pl. 74. fig. 1; *Bleek. Verhand. Batav. Genootsch.* xxv., *Japan*, p. 42.
Acanthogobius flavimanus, *Gill, Proc. Acad. Nat. Sc. Philad.* 1859, p. 145.

D. 8 | 14–15. A. 12–13.

The height of the body is contained six times and a half in the total length, the length of the head four times. Snout rather elongate, with the upper profile very slightly curved; its length is contained twice and two-thirds in that of the head. The width of the interorbital space is rather less than that of the orbit. Canine teeth none; the anterior teeth slightly enlarged. Scales of moderate size. Caudal rounded; dorsal fins rather lower than the body. Light brownish, indistinctly clouded with darker; dorsal, ventral, and anal fins greyish, pectoral and caudal yellow; dorsal and caudal dotted with brownish. (*Schleg.*)

Bay of Nagasaki.

146. Gobius newberrii.

Gobius newberrii, *Girard in Proc. Acad. Nat. Sc. Philad.* 1856, p. 136; *in Bost. Journ. Nat. Hist.* 1857, pl. 25. figs. 5–8; *in U. S. Pacif. R.R. Exped. Fishes,* p. 128.

Lepidogobius newberrii, *Gill in Ann. Lyc. Nat. Hist. New York,* vii. 1859, p. 14.

D. 8 | 13. A. 12.

The height of the body is contained five times and a half in the total length, the length of the head four times and a half. Cleft of the mouth oblique, with the jaws equal anteriorly. The diameter of the eye is about one-fourth of the length of the head. Caudal rounded; dorsal fins rather lower than the body. Scales small. Olivaceous, irregularly spotted with black; caudal, and sometimes the second dorsal, with blackish dots. (*Gir.*)

Tomales Bay (California).

147. Gobius hexanema.

Chæturichthys hexanema, *Bleek. Verhand. Batav. Genootsch.* xxv., *Japan,* p. 43. fig. 5; *Gill, Ann. Lyc. Nat. Hist. New York,* 1859, p. 16.

D. 8 | 17. A. 14–15. L. lat. 38–40.

Mandibula with six short barbels. The height of the body is one-eighth of the total length, the length of the head one-fifth. The width of the interorbital space is less than one-half of the diameter of the eye, which is contained three times and a half in the length of the head. The upper surface and the sides of the head scaly; the cleft of the mouth is oblique, and the maxillary reaches to below the anterior half of the orbit. Teeth in bands, those of the outer series being the strongest; canine teeth none. Caudal fin subrhomboid. Green, marbled with darker, and with a series of five brown spots along the side; fins brownish-violet; the second dorsal with yellowish dots.

Sea of Nagasaki. Coast of Niphon.

148. Gobius ommaturus.

Richards. Voy. Sulph. Fishes, p. 146. pl. 55. figs. 1–4.

D. 9 | 18–20. A. 15–18. L. lat. 70.

The height of the body is contained six times and a half in the total length, the length of the head four times and one-third. Snout somewhat produced; the eyes are less than the diameter of the orbit apart; the upper jaw rather longer than the lower; teeth of the outer series enlarged. Caudal rhomboidal; dorsal fins not elevated. Brownish: a dark mark occupies the centre of the base of the caudal; rays of the dorsal fins dotted with brown.

Mouth of the Yang tze Kiang. Canton. Amoy.

a. Adult. Amoy. Purchased.
b. Adult. From the Haslar Collection.

149. Gobius lepidus.

Gobius gracilis, *Girard in Proc. Acad. Nat. Sc. Philad.* 1854, p. 134.
—— lepidus, *Girard in U. S. Pacif. R. R. Exped. Fishes,* p. 127, (pl. 25 *a*. figs. 5, 6).
Lepidogobius gracilis, *Gill in Ann. Lyc. Nat. Hist. New York,* vii. 1859, p. 14.

D. 7 | 20. A. 17.

The height of the body is contained seven times and a half in the total length, the length of the head about five times. Cleft of the mouth oblique, with the jaws equal anteriorly; the maxillary reaches to the vertical from the posterior margin of the pupil. The eye is one-fourth of the length of the head; interorbital space very narrow. Teeth of the outer series somewhat enlarged. Caudal rounded; dorsal fins not elevated. Scales small; sides and crown of the head scaly. Reddish-brown; throat and fins blackish.

San Francisco (California).

150. Gobius hasta.

? Ophidium chinense, *Lacép.* i. pl. 22. fig. 3.
? Regalecus lanceolatus, *Lacép.* ii. p. 219.
? Gymnetrus cepedianus, *Shaw,* iv. p. 198. pl. 30.
Gobius hasta, *Schleg. Faun. Japon. Poiss.* p. 144. pl. 75. fig. 1.

D. 8–9 | 20. A. 17.

The height of the body is one-half of the length of the head, and one-twelfth of the total. Snout of moderate extent; the width of the interorbital space equals the vertical diameter of the orbit. The teeth of the outer series enlarged. Scales of moderate size. Caudal pointed; dorsal fins not elevated. Greenish-brown; caudal brown; the soft dorsal with four series of blackish dots.

Japan.

a. Adult. Japan.

151. Gobius stigmatias.

Chæturichthys stigmatias, *Richards. Voy. Sulph. Fishes,* p. 55. pl. 35. figs. 1–3.

D. 8 | 23. A. 19. L. lat. 53.

Several small barbels at the lower side of the mandibula. The height of the body is one-ninth of the total length. Snout with the lower jaw prominent; the width of the interorbital space equals the diameter of the eye. The anterior dorsal is as high as the body, and higher than the posterior; caudal lanceolate. A black mark on the posterior portion of the first dorsal.

South Pacific (?).

a, b. Types of the species. South Pacific. Presented by Captain Sir E. Belcher, C.B. From the Haslar Collection.

152. Gobius virgo.

Gobius virgo, *Schleg. Faun. Japon. Poiss.* p. 143. pl. 74. fig. 4.

D. 8 | 26–28. A. $\frac{1}{26}$.

Scales minute. The height of the body is one-seventh of the total length; snout moderately long, with the jaws equal in length. Caudal rounded; dorsal fins rather lower than the body. Brownish: an orange-coloured blue-edged band runs from the upper lip through the lower half of the eye to the caudal fin; another similar band from the angle of the mouth to the operculum. Dorsal fins orange-coloured, with a blue stripe below the margin; caudal and anal with the margins blue and black. (*Schleg.*)

Bay of Nagasaki.

2. EUCTENOGOBIUS.

Euctenogobius, *Gill, Ann. Lyc. Nat. Hist. New York*, 1859, p. 45.

Body elongate, covered with ctenoid scales of moderate size; gill-openings? Teeth small, in a single series in the upper jaw, and in a narrow band in the lower; canine teeth none. Two dorsal fins, the first composed of six spines. Ventral fins united, not adherent to the belly.

Amazon River.

1. Euctenogobius badius.

Euetenogobius badius, *Gill in Ann. Lyc. Nat. Hist. New York*, vii. 1859, p. 45.

D. 6 | $\frac{1}{11}$. A. $\frac{1}{11}$. L. lat. 50.

Eighteen longitudinal series of scales between the dorsal fin and the anus. The height of the body is one-seventh of the total length, the length of the head one-sixth; head somewhat higher than long; snout convex. A pore above each eye, and two on the upper half of the ascending margin of the præoperculum. Eyes close together, their diameter being one-fourth of the length of the head. Dorsal fins not elevated; caudal rounded; none of the pectoral rays silk-like. Reddish-brown, with an indistinct hoary dot in the centre of each scale; two bluish bands extend from the eye to the upper jaw; caudal fin with about seven cross-bars; the other fins almost uniform. (*Gill.*)

Amazon River.

See also *Gobius oxypterus* (p. 34), which is said to have the teeth in a single series.

3. LATRUNCULUS.

Body rather elongate, covered with deciduous cycloid scales of moderate size; gill-openings rather wide. Cleft of the mouth very wide; jaws with a series of long teeth, and with strong canine teeth; the upper jaw with a second series, which is formed by the canine teeth. Two dorsal fins, the first composed of five spines. Ventral fins united, not adherent to the belly. Pseudobranchiæ. Vertebræ 11/16.

Coasts of Scotland.

This genus is much more closely allied to *Apocryptes* than to *Gobius*, its dentition differing from that of the former only in the arrangement of the canine teeth. The form of the teeth of the outer series is exactly that which we observe in *Apocryptes*; but there is a second short series behind it, formed by two groups of strong and curved canine teeth, each group occupying the front part of the intermaxillary. The teeth of the lower jaw are subhorizontal; a strong, curved canine tooth is placed interiorly to the end of the series of outer teeth.

Apocryptes brachypterus, Bleek., appears to have more affinity to this genus than to the typical species of *Apocryptes*.

1. Latrunculus albus.

The White Goby.

Gobius albus, *Parnell in Trans. Roy. Soc. Edinb.* xiv. 1837, and in *Suppl. Hist. Brit. Fishes*, p. 27; *Yarrell, Brit. Fishes*, 2nd edit. i. p. 295, 3rd edit. ii. p. 333.

D. 5 | $\frac{1}{12}$. A. $\frac{1}{12}$. Vert. 11/16.

The interorbital space is wider than the eye; the ventral does not extend on to the vent. Transparent.

Solway Frith; Frith of Forth.

a. Many specimens. Solway Frith.
b, *c*–*g*. Frith of Forth.
h. From the Collection of the Zoological Society.

4. APOCRYPTES.

Apocryptes, *Cuv. & Val.* xii. p. 142.

Body elongate, covered with small scales, which become larger posteriorly; gill-openings of moderate width. Teeth in a single series, conical and fixed, with canines in both the jaws, or at least in the lower. The spinous portion of the dorsal fin separated from or continuous with the soft, composed of five or six spines. Ventral fins united, not adherent to the belly. Pseudobranchiæ rudimentary. Vertebræ 12/15.

East Indian Seas and fresh waters.

1. Apocryptes lanceolatus.

Eleotris lanceolata, *Bl. Schn.* p. 67. tab. 15.
Gobius changua, *Buch. Ham.* pp. 41, 365. pl. 5. fig. 10.

Apocryptes changua, *Cuv. & Val.* xii. p. 145; *Bleek. Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* pp. 5, 36.
—— lanceolatus, *Cantor, Catal.* p. 187.

D. 5 | 31. A. 30.

Scales exceedingly small. The height of the body is one-ninth of the total length. Snout obtuse, rounded, somewhat longer than the eye, which is small. Jaws equal. Teeth of moderate size, those of the lower jaw horizontal; a pair of small canines near the symphysis; the maxillary reaches to the vertical from the posterior margin of the eye. Caudal fin lanceolate, its length being two-ninths of the total. Greyish-brown, indistinctly marbled with darker; caudal brown-dotted.

Shores of the East Indian Seas.

a–c. Adult. India. Presented by G. R. Waterhouse, Esq.
d, e. Adult: skins. Malayan Peninsula. From Dr. Cantor's Collection.
f, g–h. Adult. Madras.

2. **Apocryptes dentatus.**

Cuv. & Val. xii. p. 148.

D. 5 | 32. A. 31. Vert. 12/15.

Scales exceedingly small. The height of the body is one-fourteenth of the total length; snout rounded, longer than the eye, which is one-sixth of the length of the head. Gape horizontal, with the jaws equal anteriorly, extending to behind the vertical from the posterior margin of the eye. Teeth large, those of the lower jaw horizontal; a pair of canines near the symphysis. Caudal fin lanceolate, its length being two-ninths of the total. Brownish; caudal brown-dotted. (*Val.*)

Coasts of Pondicherry. Bengal.

3. **Apocryptes borneensis.**

Bleeker, Borneo, ix. p. 421.

D. 5 | 28–30. A. 26–27.

Scales exceedingly small. The height of the body is one-tenth or one-twelfth of the total length; snout obtuse, very convex, shorter than the eye, which is one-fourth or one-fifth of the length of the head. Gape nearly horizontal, reaching to below the posterior part of the orbit. Teeth of moderate size, those of the lower jaw horizontal; a pair of large canines near the symphysis of the mandibula. Caudal fin lanceolate, its length being nearly one-fourth of the total. Greenish, dotted with black; tail with angular transverse streaks, the angles being directed forwards. The anterior dorsal with a small spot anteriorly and with a large one posteriorly; the second dorsal and the caudal black-dotted. (*Bleek.*)

Rivers of Bandjermassing.

4. Apocryptes bato.

Gobius bato, *Buch. Ham.* p. 40. pl. 37. fig. 10.
Apocryptes bato, *Cuv. & Val.* xii. p. 143. pl. 349; *Bleeker, Verhand. Batav. Genootsch.* xxv., *Bengal. en Hindost.* p. 103.

D. 5 | 21. A. 22.

Scales exceedingly small. The height of the body is one-eighth of the total length; snout obtuse, rounded, equal in length to the diameter of the eye, which is one-fifth of the length of the head. Gape horizontal, reaching to below the middle of the eye, with the upper jaw a little longer than the lower. Teeth small; a pair of small canines at the symphysis of the lower jaw. Caudal fin lanceolate, its length being two-ninths of the total. Greenish; body and dorsal fins dotted with dark brown.

Mouth of the Ganges. River Hooghly (Calcutta).

5. Apocryptes serperaster.

Richards. Ichthyol. China, p. 206.

D. 6 | 27. A. 27.

Scales small anteriorly, becoming larger posteriorly. The height of the body is one-ninth or one-eleventh of the total length. Snout obtuse, rounded, somewhat longer than the eye, with the upper jaw rather longer than the lower; gape of moderate width, the maxillary extending to below the posterior margin of the eye. Teeth small; the front teeth of the upper jaw enlarged, those of the lower horizontal; a pair of small canines near the symphysis, another on each side of the mandibula. Dorsal fins not continuous. Greenish-olive; caudal darker.

Chinese Seas.

a. Adult. China. Presented by J. R. Reeves, Esq.—Type of the species.
b, c. Adult. China. From the Haslar Collection.
d–e. Half-grown. Bengal. From the Collection of the East India Company.
f–k, l–t, u–w, x. Adult and half-grown: not good state. From the Haslar Collection.

6. Apocryptes rictuosus.

Cuv. & Val. xii. p. 151.

D. 6 | 25–27. A. 27.

Scales small anteriorly, becoming larger on the tail. The height of the body is one-fourteenth of the total length, the length of the caudal fin one-third. Snout obtuse, somewhat longer than the eye; the lower jaw slightly prominent. Teeth small, those of the lower jaw horizontal; a pair of small canine teeth near the symphysis, and another canine tooth on each side of the lower jaw. Gape wide, the maxillary extending beyond the posterior margin of the eye. Dorsal fins continuous. The hindmost part of the dorsal fin and the caudal brown-dotted.

Madras. Coast of Pondicherry.

a, b. Half-grown. Madras. Presented by T. C. Jerdon, Esq.

7. Apocryptes macrolepis.

Bleeker, Borneo, iii. p. 66.

D. 6 | 29. A. 28.

Scales small anteriorly, becoming larger on the tail. The height of the body is one-eleventh of the total length, the length of the caudal fin one-fourth. Snout obtuse, as long as the eye, which occupies the second fifth of the length of the head. The anterior teeth of the upper jaw enlarged, those of the lower horizontal; a pair of large canines near the symphysis. The gape reaches to below the posterior margin of the eye. Dorsal fins continuous at the base. Green, clouded with brown; dorsal fins black-spotted; caudal blackish, with the rays greenish. (*Bleek.*)

Rivers of Bandjermassing.

8. Apocryptes nexipinnis.

Cantor, Catal. p. 188.

D. 6 | 26. A. 26.

Scales rather small anteriorly, becoming large posteriorly. The height of the body is one-eleventh of the total length, the length of the caudal fin one-fifth. Snout rounded, longer than the eye, which occupies the third seventh of the length of the head. Gape very wide, the maxillary extending far beyond the vertical from the eye. Teeth in the jaws horizontal; the upper jaw with a pair of strong fangs anteriorly, the lower with a smaller canine tooth on each side. Dorsal fins continuous. Slate-coloured; dorsal and caudal fins minutely dotted with brown.

Sea of Pinang.

a, b. Skins. Sea of Pinang. From Dr. Cantor's Collection.—Types of the species.

9. Apocryptes henlei.

Bleeker, Verhand. Batav. Genootsch. xxii., *Blenn. en Gob.* p. 37.

D. 6 | 27. A. 28.

Scales small anteriorly, becoming larger posteriorly. The height of the body is one-tenth or one-eleventh of the total length; the eye occupies the second fifth of the length of the head. The gape reaches behind the eye. Anterior teeth of the upper jaw enlarged, those of the lower horizontal; two canines near the symphysis. The length of the caudal is one-fourth of the total. Uniform greenish. (*Bleek.*)

Coasts of Java and Madura.

10. Apocryptes madurensis.

Bleeker, Verhand. Batav. Genootsch. xxii., *Blenn. en Gob.* p. 35.

D. 6 | 23. A. 22. L. lat. 35 ?

The height of the body is one-seventh of the total length, the diameter of the eye one-fifth of the length of the head. Gape wide, extending behind the eye; teeth of the upper jaw vertical, conical, twenty or thirty in number; the lower jaw with about fifty horizontal bilobate teeth, and with two canines near the symphysis. Caudal lanceolate, two-ninths of the total length. Greenish: the first dorsal with a black spot between the third and fourth spines. (*Bleek.*)

Coasts of Java and Madura.

11. Apocryptes glyphidodon.

Bleeker, Verhand. Batav. Genootsch. xxii., *Blenn. en Gob.* p. 36.

D. 6 | 22. A. 22. L. lat. 50.

The height of the body is one-ninth of the total length; the eye occupies the third sixth of the length of the head. Gape wide, extending behind the eye; teeth of the upper jaw vertical, conical, sixteen in number; the lower jaw with about twenty-four horizontal bilobate teeth, and with two canines near the symphysis. The length of the caudal is two-ninths of the total. Greyish, with five light-brown spots along the sides; head and body minutely dotted with black. (*Bleek.*)

Sea of Batavia.

12. Apocryptes brachypterus.

Bleeker, Java, iii. p. 401.

D. 5 | 8. A. 13. L. lat. 25.

The height of the body is one-sixth of the total length. Snout depressed, shorter than the eye, which is one-fourth of the length of the head. The upper jaw is shorter than the lower, the gape being very oblique; the maxillary reaches to below the anterior part of the orbit. Teeth large, widely set; a pair of canines near the symphysis of the lower jaw. Caudal fin obtuse, its length being nearly one-sixth of the total. Greenish, transparent; anal rays slightly dotted with black. (*Bleek.*)

Lake Grati (province of Pasuruan, Java).

5. EVORTHODUS.

Evorthodus, *Gill in Proc. Acad. Nat. Sc. Philad.* 1859, p. 195.

Body elongate, covered with ctenoid scales of moderate size; head thick, short; gill-openings of moderate width. Teeth in a single series, with the crown emarginate, those of the lower jaw nearly horizontal; canines none. Two dorsals, the first with six spines. Ventral fins united, not adherent to the belly.

Fresh waters of Trinidad and of Surinam.

1. Evorthodus breviceps.

Gill, l. c.

D. 6 | $\frac{1}{10}$. A. $\frac{1}{11}$. L. lat. 32.

The height of the body nearly equals the length of the head, and is one-fifth or one-sixth of the total; the diameter of the eye is one-third or one-fourth of the length of the head; caudal rounded, one-fifth of the total length. The rays of the first dorsal filiform. Light brown, with irregular blackish blotches; dorsal fins with series of brown dots.

From a river in the Island of Trinidad. Surinam.

One specimen, from Surinam, is in the Leyden Museum.

6. GOBIOSOMA*.

Gobiosoma, *Girard in Proc. Acad. Nat. Sc. Philad.* 1858, p. 169.

Scales none. Body elongate, cylindrical; head not compressed. Teeth small, villiform or cardiform. Two dorsal fins: the anterior with six to eight (two) flexible spines, the posterior of greater extent than the anterior. Anal similar to the soft dorsal in form and size, terminating at some distance from the caudal. Ventral fins united to a disk, which is not attached to the belly. Gill-opening vertical, of moderate width, the gill-membrane being united to the isthmus.

1. Gobiosoma alepidotum.

Gobius alepidotus, *Bl. Schn.* p. 547; *Dekay, New York Fauna, Fishes,* p. 160. pl. 23. fig. 70.
—— boscii, *Lacép.* ii. p. 555. pl. 16. fig. 1; *Cuv. & Val.* xii. p. 96.
—— viridipallidus, *Mitch. Trans. Lit. & Phil. Soc. New York,* i. p. 379. pl. 1. fig. 8.
Gobiosoma alepidotum, *Girard, l. c.*

D. 6 | $\frac{1}{13}$. A. $\frac{1}{10}$.

Body slender, with the caudal fin pointed; eyes very close together; cleft of the mouth small. Greenish-brown, with seven or eight paler transverse bars; fins dark brown; caudal with two or three curved bars.

Coasts of North America between New York and Charleston.

2. Gobiosoma diadematum.

Gobius diadematus, *Rüpp. Atl. Fische,* p. 137, & *N. W. Fische,* p. 138.

D. 6 | 13. A. 11.

Head rather depressed, rounded; body elongate; caudal fin rounded; canine teeth none. Brownish-yellow, with an umber-brown band from the crown of the head through the eye towards the angle of the præoperculum; head with brown dots, back with brown spots and streaks; dorsal and anal fins with a brown band near the margin. (*Rüpp.*)

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* 1. Gobiosoma molestum, *Girard, l. c.*—Coast of Texas.

Suez.

3. Gobiosoma macrognathos.

Gobius macrognathos, *Bleek. Act. Soc. Sc. Indo-Nederl.* vi., *Japan*, vi. p. 83. tab. 1. fig. 1.

D. 6 | $\frac{1}{12}$. A. $\frac{1}{10}$.

Body elongate, with the caudal fin rounded; head depressed, pointed, its length being two-ninths of the total; eyes of moderate size, directed upwards; cleft of the mouth wide, extending behind the orbit, with the jaws equal in length. Violet-rose-coloured, dotted with brown superiorly, the dots forming bands across the back. Vertical fins with brown dots, ventrals black. (*Bl.*)

Rivers of Jeddo.

4. Gobiosoma ophicephalum.

Gobius ophicephalus, *Jenyns, Zool. Beagle, Fishes*, p. 97. pl. 19. fig. 3, cop. by *Gay, Hist. Chil. Zool.* ii. p. 291 (not *Pall.*).

D. 8 | $\frac{1}{16}$. A. $\frac{1}{13}$.

The height of the body is one-eighth of the total length, the length of the head one-fifth; head flattened, depressed, with prominent, small, wart-like dots; teeth of the outer series enlarged; dorsal fins as high as the body; caudal rounded. Pale lead-colour, coarsely reticulated with brown. (*Jen.*)

Chonos Archipelago.

The following species appear to have more affinity to this genus than to any other:—

5. Gobiosoma nilssonii.

Gobius nilssonii, *Düb. & Kor. in Vet. Akad. Handl. Stockh.* 1845, p. 53. tab. 2. fig. 3; *Nilss. Skand. Faun.* iv. p. 227.

—— linearis, *Düb. & Kor. in Öfversigt af Vetensk. Akad. Handl.* 1845, i. p. 111.

B. 5. D. 2 | 19–21. A. 20–22.

The height of the body is one-eighth or one-ninth of the total length; cleft of the mouth oblique, with the lower jaw prominent. Caudal subtruncated. Transparent.

Specimens of this singular species, 18 lines in length, have been discovered on the coast of Norway.

6. Gobiosoma stuvitzii.

Gobius stuvitzii, *Düb. & Kor. l. c.* p. 59. tab. 2. fig. 4; *Nilss. l. c.* p. 229.

D. 5 | 12–13. A. 14–15.

The height of the body is one-eighth or one-ninth of the total length. Cleft of the mouth oblique, with the lower jaw prominent; teeth minute. Caudal subtruncated. Transparent.

Bergen.

This species has been compared with the Scottish *Gobius albus.* The remarkably strong teeth of the latter prove its distinctness, even if *G. stuvitzii* be provided with deciduous scales, which might have escaped observation.

7. GOBIODON*.

Gobiodon, (*Kuhl & v. Hass.*) *Bleek. Boeroe*, p. 407.

Body oblong, more or less compressed, naked; head large, elevated; gill-openings of moderate width. Generally two canine teeth near the symphysis of the lower jaw. Two dorsal fins united at the base, the anterior with six spines. Ventral fins united.

Indian Seas.

1. Gobiodon citrinus.

Gobius citrinus, *Rüppell, N. W. Fische*, p. 139. tab. 32. fig. 4.

D. 6 | $\frac{1}{10}$. A. $\frac{1}{8}$.

Scales none. Body short and compressed. Canine teeth none. Yellow: a blue, black-edged streak along the base of the dorsal and anal fins; four transverse streaks of the same colour—two descending from the eye, the third from the vertex to the opercles, and the fourth in front of the pectoral fins. (*Rüpp.*)

Red Sea.

2. Gobiodon rivulatus.

Gobius rivulatus, *Rüppell, Atlas, Fische*, p. 136, and *N. W. Fische*, p. 138.

D. 6 | 11. A. $\frac{1}{8}$.

Scales none. Body elliptical, compressed. Dorsal fins subcontinuous; ventrals small. Canine teeth small. Green, reticulated with red; all the fins green. Brown (in spirits); head lighter, with several whitish vertical lines; fins brownish-black.

Island of Jubal (Red Sea).

a, b. Fine specimens. Jubal. Collected and presented by Dr. E. Rüppell.

3. Gobiodon quinque-strigatus.

Gobius quinque-strigatus, *Cuv. & Val.* xii. p. 134; *Bleek. in Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* p. 29, & *Solor*, p. 82.

D. 6 | $\frac{1}{10}$. A. $\frac{1}{9}$.

Scales none or inconspicuous; no tubercles on the forehead.

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* 1. Gobius coryphænula, *Cuv. & Val.* xii. p. 131.—Guam.
2. Gobius erythrophaios, *Bleek. Verh. Batav. Genootsch.* xxii., *Blenn. en Gob.* p. 29.—Gobiodon erythrophaios, *Bleek. Boeroe*, p. 409 —East Indian Archipelago.

Body short, compressed, its height being one-third of the total length; head as high as long, with the anterior profile parabolic. Ventrals short. Canine teeth. Yellow: head and thoracic region with five vermilion transverse bands; body with seven longitudinal series of spots of the same colour.

Seas of Tongatabou, Solor, Booroo, Goram, and Sumbawa.

4. Gobiodon ceramensis.

Gobius ceramensis, *Bleeker, Ceram*, ii. p. 704.

$$D. 6 \Big| \tfrac{1}{10}. \quad A. \tfrac{1}{9}.$$

Scales inconspicuous. The height of the body is contained three times and a half in the total length, the length of the head four times and a third or four times and a half. The head is compressed, as high as long; snout obtuse, convex, shorter than the eye. Lower jaw with small canine teeth. Dorsal fins much lower than the body; caudal rounded. Entirely black or brown, with black fins.

Seas of China, Wahai, Borneo, Amboyna, and of the Feejee Islands.

a–b. China Seas. Presented by Captain Sir E. Belcher, C.B.

c–d. Two specimens from Borneo, purchased of Mr. Frank as *Gobiodon erythrophæus*, appear to agree better with *Gobiodon ceramensis*; they are uniform brown, with black fins, without any blue or black streaks.

e–g. Three others, from the Feejee Islands, procured during the voyage of the 'Herald,' agree with the former.

h–i. Amboyna. Purchased of Mr. Frank.

5. Gobiodon histrio.

Gobius histrio, (*Kuhl & v. Hass.*) *Cuv. & Val.* xii. p. 132. pl. 347; *Bleek. Natuurk. Tydschr. Nederl. Ind.* 1851, i. fig. 6.

$$D. 6 \Big| \tfrac{1}{10}. \quad A. \tfrac{1}{9}.$$

Scales none or inconspicuous; two or three small tubercles on the forehead. Body short, compressed, its height being one-third of the total length; head higher than long, with the anterior profile parabolic. Ventrals very short. Canine teeth. Rose-coloured, with irregular blue spots and streaks, vertical on the head, longitudinal on the body. (*Val.*)

Sunda Sea. Friendship Islands.

6. Gobiodon heterospilos.

Bleeker, Boeroe, p. 409.

$$D. 6 \Big| \tfrac{1}{8}. \quad A. \tfrac{1}{8}.$$

The height of the body is contained three times and three-quarters in the total length, the length of the head four times and a half; head as high as long; large canine teeth near the symphysis of the lower jaw. Yellowish rose-coloured; head and caudal fin black-spotted; dorsal and anal fins minutely dotted with brown. (*Bleek.*)

Sea of Kajeli.

7. Gobiodon micropus.

D. 6 | 14. A. 12.

Head and body strongly compressed; the height of the body is one-third of the total length, the length of the head one-fifth. The upper profile of the head is strongly convex, becoming subvertical anteriorly; snout elevated, but very short; cleft of the mouth narrow; a pair of strong canine teeth near the symphysis of the lower jaw. Eye rather small. Dorsal and anal fins rather elevated, but much lower than the body; the spines of the anterior dorsal increase in length posteriorly, and the last is connected with the first ray by a low membrane. Caudal convex. Ventral disk very short, not quite one-half the length of the head, not adherent to the belly. Uniform olive (in spirits); vertical fins black, the base of the dorsal and anal being yellowish.

	lines.
Total length	18
Length of the head	3½
Height of the body	6

China Seas.

a. China Seas. Presented by Captain Sir E. Belcher, C.B.

8. TRIÆNOPHORICHTHYS.

Triænophorus, *Gill in Ann. Lyc. Nat. Hist. New York*, 1859, p. 17.
Triænophorichthys, *Gill in Proc. Acad. Nat. Sc. Philad.* 1859, p. 195.

Body subcylindrical, covered with ctenoid scales of moderate or rather small size; head oblong, broad, rather depressed, with the cleft of the mouth nearly horizontal, and with the jaws of equal length; both jaws with a series of erect, closely-set, tricuspid teeth. Eyes of moderate size. Two dorsal fins, the anterior with six flexible spines; caudal quite free; ventrals united, not adherent to the belly. Gill-openings of moderate width. Pseudobranchiæ; a slit behind the fourth gill.

Coast of China (Hongkong).

1. Triænophorichthys trigonocephalus.

Gill, l. c. p. 18.

D. 6 | 12–13. A. 12. L. lat. 55.

Sixteen to eighteen longitudinal series of scales between the second dorsal fin and the anal. The height of the body is somewhat less than the length of the head, and one-fifth of the total. The head is rather broader than high, its width being five-sevenths of its length; it is flat above, and the width between the orbits equals the diameter of the eye, which is one-fifth of the length of the head. The snout is longer than the eye, obtuse, with the upper profile straight and with the anterior rounded; the cleft of the mouth is very slightly oblique, with the jaws equal anteriorly; the maxillary extends beyond the anterior margin of the orbit. Canine teeth none; teeth of the outer series closely set, tricuspid. Head naked, nape scaly, scales ctenoid. Dorsal fins nearly equal in height, lower than the body; caudal obtusely rounded; none of the pectoral rays silk-like; the ventrals terminate at some distance from the vent, and have the basal membrane very well developed. Uniform reddish-olive (in spirits); the gill-membrane white-dotted; pectoral with a whitish cross-band near the base.

China.

a. Not good state. China.
b–e, *f–h*. China.

	lines.
Total length	35
Height of the body	7
Length of the head	7½
Greatest width of the head	5½
Diameter of the eye	1½

2. Triænophorichthys barbatus.

D. 6 \| 11. A. 11. L. lat. 35.

Two series of small barbels across the cheek, another along the mandibula and the præopercular margin. Twelve longitudinal series of scales between the origin of the second dorsal fin and the anal. The body is anteriorly depressed, its height being one-fifth of the total length. The head is much depressed, and nearly as broad as long; its length is one-fourth of the total; its upper surface is flat, and the width of the interorbital space is much more than the horizontal diameter of the small eye. The snout is rounded, broad, obtuse, longer than the eye, with the jaws equal in length. The cleft of the mouth is horizontal, and extends to the anterior margin of the orbit. Both jaws are armed with a series of closely-set tricuspid teeth, behind which is another series of smaller ones for replacing those in front. Head and the foremost part of the neck naked; scales ciliated. Dorsal fins lower than the body, the posterior higher than the anterior; caudal convex; none of the pectoral rays silk-like. The pectorals do not quite extend to the vertical from the vent, and the ventrals are still shorter. The latter are not attached to the belly, and have a very broad basal membrane. Reddish-olive or brownish, with very large band-like brown blotches, the anterior of which is below the first dorsal, extending on that fin; another extends on the soft dorsal.

Probably from China.

a, *b–c*, *d*. From the Haslar Collection.

	lines.
Total length	33
Height of the body	6
Length of the head	8
Greatest width of the head	7
Diameter of the eye	1

9. BENTHOPHILUS.

Benthophilus, *Eichw. Zool. Spec.* iii. p. 77.

Body moderately elongate, tubercular; scales none; head broad, depressed. Gill-openings closed, except a small aperture superiorly. Teeth small. Two dorsal fins, the anterior with three spines. Ventral fins united. Branchiostegals four.

Caspian Sea.

1. Benthophilus macrocephalus.

Gobius macrocephalus, *Pallas, Nov. Act. Petrop.* i. p. 52. pl. 7. figs. 4–6, and *Zoogr.* iii. p. 163; *Cuv. & Val.* xii. p. 126.

Benthophilus macrocephalus, *Eichw. Zool. Spec.* iii. p. 77, and *Bull. Soc. Nat. Mosc.* 1838, ii. p. 139; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 440, *Poiss.* pl. 14. fig. 2.

Hexacanthus macrocephalus, *Nordm. in Bull. Acad. St. Petersb.* 1837.

D. $3 \left| \frac{1}{8} \right.$. A. 9.

Skin rough, tubercular. Head depressed, subcircular, as broad as long, one-third of the total length. The cleft of the mouth wide, not extending to the eye. Greyish, spotted with blackish.

Caspian Sea.

10. SICYDIUM.

Sicydium, *Cuv. & Val.* xii. p. 167.

Sicydium et Sicyopterus, *Gill in Proc. Acad. Nat. Sc. Philad.* 1860, p. 101.

Body subcylindrical, covered with ctenoid scales of rather small size; head oblong, with the cleft of the mouth nearly horizontal and with the upper jaw prominent; lips very thick; the lower lip generally with a series of minute teeth. A series of numerous small teeth in the upper jaw, implanted in the gum and moveable (fixed in the last two species); the lower jaw with a series of conical widely-set teeth. Eyes of moderate size. Two dorsal fins, the anterior with six (five) flexible spines; caudal quite free; ventral fins united to a short semicircular disk, more or less adherent to the belly. Gill-openings of moderate width; branchiostegals four; air-bladder none. Pseudobranchiæ, a slit behind the fourth gill.

A tropical genus, inhabiting fresh waters near the sea. One species from the West Indies, the others from the East Indian Islands,—the extreme points of their range being Ile de France. Japan, and Hilo Hawaii.

a. Front teeth of the lower jaw not larger than the others.

1. Sicydium plumieri.

Gobius plumieri, *Bl.* v. p. 125. pl. 178. fig. 3; *Bl. Schn.* p. 69; *Lacép.* ii. pp. 537, 562. pl. 15. fig. 2.
Sicydium plumieri, *Cuv. & Val.* xii. p. 168.

B. 4. D. $6 \mid \frac{1}{10}$. A. $\frac{1}{10}$. L. lat. 85. Vert. 11/15.

Scales sometimes rather irregularly arranged. Some of the dorsal spines produced into long ribands. Uniform brown, or yellowish-olive marbled with brown.

Rivers of the West Indies.

a. Adult. Barbadoes. Purchased of Mr. Cuming.
b–d. Adult: stuffed. West Indies. From Dr. Parnell's Collection.
e–h, i–l, m–n. Adult and half-grown. From the Collection of the Zoological Society.
o. Adult: skeleton. From the Collection of the Zoological Society.

Skeleton.—The general form of the skull has been noticed by Valenciennes, but the skeleton from which he has taken his notes appears to have been defective; he says, "le maxillaire n'est aussi qu'un léger filet." On the contrary, we find that that bone is very stout and long, curved like a prolonged $\int$, receiving the sabre-shaped præorbital in its posterior concavity, and the intermaxillary in its anterior. Both maxillary bones are rather remote from each other in consequence of the great breadth of the snout, and each has a flat process superiorly, bent towards that of the other side. The posterior process of the intermaxillary is short and exceedingly broad, so that the outlines of the entire bone form an elongate rectangular triangle. The mandibles are feeble, and the dentary has nearly a transverse direction. The pubics form together a bony capsule which is completely closed, and only open anteriorly; each pubic bone is separately articulated to the humerus of its side, as in *Gobius.*

There are eleven abdominal and fifteen caudal vertebræ, the latter division being only a little longer than the former. Ribs moderately developed, with long epipleurals. The neural spines of the abdominal vertebræ are short, stout, and depressed.

β. The two front teeth in the lower jaw enlarged.

2. Sicydium lagocephalum.

Gobius lagocephalus, *Koelreuter, Nov. Comm. Petrop.* ix. p. 428. pl. 9. figs. 3, 4; *Pall. Spicil. Zool.* viii. p. 14. pl. 2. figs. 5–7.
Sicydium lagocephalum, *Cuv. & Val.* xii. p. 174.

D. $6 \mid \frac{1}{11}$. A. $\frac{1}{11}$.

The scales on the neck and belly are as large as the others. The breadth and height of the head are equal. The anterior dorsal is as high as the body. Greyish-brown (in spirits), sometimes clouded with darker; the second dorsal with four or five series of brown dots; anal with a blackish and white margin; caudal blackish, superiorly and inferiorly white-edged.

Rivers of Ile de France and Bourbon.

3. Sicydium laticeps.

Cuv. & Val. xii. p. 177.

D. 6 | $\frac{1}{11}$. A. $\frac{1}{10}$.

The scales on the neck and belly are nearly as large as the others; the head is one-third broader than high. The third and fourth dorsal spines elongate, filiform. Uniform blackish; caudal with whitish margins. (*Val.*)

Rivers of Bourbon.

4. Sicydium stimpsoni.

Gill in Proc. Acad. Nat. Sc. Philad. 1860, p. 101.

D. 6 | 11. A. 11.

The head is as broad as high. The second dorsal spine filiform. Purplish, with seven darker cross-bands; caudal fin and base of the dorsal and anal white-dotted. (*Gill.*)

Rivers of Hilo Hawaii.

5. Sicydium xanthurum.

Bleeker, Sumatra, ii. p. 271.

D. 6 | $\frac{1}{11}$. A. $\frac{1}{10}$. L. lat. 50.

The scales on the neck and on the sides are nearly equal in size to those on the tail. The anterior dorsal higher than the body. Blackish: tail orange-coloured posteriorly; dorsal and anal fins brown; caudal yellow, with a horseshoe-like black mark and with the angles violet; pectoral yellow-edged. The width of the eye equals that of the interorbital space. (*Bl.*)

Rivers of West Sumatra and Bali.

6. Sicydium micrurum.

Bleeker, Amboina, iv. p. 341.

D. 6 | $\frac{1}{10}$. A. $\frac{1}{10}$. L. lat. 55–60.

The length of the caudal fin is six times or six times and a half in the total. The width of the interorbital space is much more than that of the orbit. Scales on the neck, body and tail nearly equal in size. The anterior dorsal fin is not higher than the body. Greenish above, with about eight blackish cross-bars; a blackish band along the side, most distinct on the base of the caudal and on its middle rays. Dorsal and anal fins immaculate, the latter with a blackish intramarginal band; caudal with a black horseshoe-like mark; pectoral and ventral yellow.

Rivers of Amboyna and Bali.

a. Adult. Amboyna. Purchased of Mr. Stevens.

7. Sicydium macrostetholepis.

Bleeker, Sumatra, ii. p. 271.

$D.\ 6 \,\Big|\, \frac{1}{11}.\quad A.\ \frac{1}{10}.$ L. lat. 50. Vert. 11/15.

The anterior lateral scales are larger than the posterior ones, and than those on the occiput. The first dorsal higher than the body. Blackish-green; dorsal and anal fins brownish, with numerous small black dots, the latter black-edged; caudal with a horseshoe-like black mark; pectoral yellow-edged. The width of the eye is much less than that of the interorbital space.

Rivers of West Sumatra and Aneiteum.

a, b. Fine specimens. Aneiteum. From Mr. Macgillivray's Collection.

c. Adult: skeleton. Aneiteum. From Mr. Macgillivray's Collection.

Each pubic bone is composed of two lamellæ, united at a right angle. They do not form a capsule so completely closed as in *S. plumieri*, but it is open superiorly and anteriorly. There are eleven abdominal and fifteen caudal vertebræ, the latter division being somewhat longer than the former.

8. Sicydium parvei.

Bleeker, Natuurk. Tydschr. Nederl. Ind. 1853, i. p. 426.

$D.\ 6 \,\Big|\, \frac{1}{10}.\quad A.\ \frac{1}{10}.$ L. lat. 70.

The scales on the occiput and the anterior part of the body are much smaller than those on the middle and on the tail. The first dorsal fin higher than the body. Blackish: caudal yellow, with a broad violet band round the margin; the other fins brownish.

Moluccas. Rivers of Garut (West Java).

a, b, c. Adult. Moluccas.

9. Sicydium cynocephalum.

Sicydium cynocephalum, *Cuv. & Val.* xii. p. 177. pl. 352; *Bleek. Batjan,* ii. p. 201, and *Natuurk. Tydschr. Nederl. Ind.* 1859, p. 156.

—— lagocephalum, *Bleek. Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* p. 39 (not *Val.*).

Gobius hasseltii, *Bleek. Natuurk. Tydschr. Nederl. Ind.* i. p. 250. fig. 8.

$D.\ 6 \,\Big|\, \frac{1}{11}.\quad A.\ \frac{1}{10}.$ L. lat. 70–80.

The scales on the neck and belly are much smaller than those on the sides. The anterior dorsal fin generally higher than the body. Dark green, with indistinct oblique brownish bands across the back;

a brown spot below the eye; dorsal and anal fins orange-coloured; the second dorsal sometimes with brownish spots; the anal with a broad brown margin; caudal olive, with the superior and inferior edges yellow; pectoral yellow-edged.

Rivers of the East Indian Archipelago.

Found in fresh waters 3000 feet above the level of the sea.

10. Sicydium microcephalum.

Bleeker, Java, ii. p. 437.

D. $6 \mid \frac{1}{10}$. A. $\frac{1}{10}$. L. lat. 60.

The length of the head is contained six times and two-thirds or six times and three-quarters in the total length. The scales on the neck and thoracic region are much smaller than the others. The first dorsal considerably higher than the body. Olive, spotted with yellow; dorsal, caudal, and pectoral violet, dotted with darker; caudal and pectoral with yellow, anal with brown margin. (*Bl.*)

Rivers of Banten (Java).

11. Sicydium gymnauchen.

Bleeker, Act. Soc. Sc. Indo-Nederl. iii., *Celebes,* x. p. 11.

D. $5 \mid \frac{1}{9}$. A. $\frac{1}{10}$. L. lat. 40.

Head and anterior part of the trunk scaleless. The first dorsal lower than the body; caudal emarginate. Green, with eight black cross-bands; anal with blackish dots at the base. [The bands are sometimes indistinct or absent.] (*Bl.*)

Estuaries of Manado.

The following species differ in the structure of the dentition:—

12. Sicydium zosterophorum.

Bleeker, Bali, p. 296.

D. $6 \mid \frac{1}{9}$. A. $\frac{1}{9}$. L. lat. 32.

Labial teeth none; a series of five or six unequal, widely-set, conical teeth in both jaws on each side. The diameter of the eye is contained three and a half times in the length of the head, and equals the width of the interorbital space. The height of the body is one-eighth of the total length. Head and neck scaleless. The anterior dorsal is somewhat lower than the body; caudal obtusely rounded. Head violet, body greenish rose-coloured, encircled by four brown rings: the first is the broadest, extending from the first dorsal spine to the origin of the soft dorsal fin; the second and third are narrow, between the soft dorsal and the anal; the fourth behind the anal; each scale between the rings with a brown crescent-shaped spot; caudal yellow anteriorly, black posteriorly. (*Bl.*)

Rivers of Boleling (North Bali).

13. Sicydium balinense.

Bleeker, Bali, p. 297.

D. 6 | $\frac{1}{9}$. A. $\frac{1}{9}$. L. lat. 35.

Labial teeth none; both jaws with a series of conical teeth, twenty on each side of the upper jaw, and ten in the lower. The diameter of the eye is contained three and a half times in the length of the head, and equals the width of the interorbital space. The height of the body is one-eighth of the total length. Head and the anterior part of the neck scaleless. The anterior dorsal fin is half as high as the body; caudal obtusely rounded. Greenish rose-coloured: a violet streak from the eye to the maxillary, a brown band from the head to the tail; back and sides clouded with brownish; most of the scales on the sides with a brown crescent-shaped spot; caudal violet posteriorly. (*Bl.*)

Rivers of Boleling (North Bali).

11. LENTIPES.

Sicyogaster, *Gill in Proc. Acad. Nat. Sc. Philad.* 1860, p. 102 (not *Barnev.*).

Body subcylindrical, naked; head oblong, depressed, with the cleft of the mouth horizontal; eyes of moderate size. The lower lip with a series of minute teeth. Both jaws with a single series of teeth; the anterior ones in the upper jaw tricuspid, those of the lower widely-set. Two dorsal fins, the anterior with six flexible spines; caudal quite free; ventral fins united to a short semicircular disk, adherent to the belly. Gill-openings of moderate width.

Rivers of Hilo Hawaii.

1. Lentipes concolor.

Gill, l. c.

D. 6 | 11. A. 10.

Purplish.

Rivers of Hilo Hawaii.

12. PERIOPHTHALMUS*.

Periophthalmus, *Bl. Schn.* p. 63; *Cuv. & Val.* xii. p. 179.

Body subcylindrical, covered with ctenoid scales of small or moderate size; head oblong, with the cleft of the mouth nearly horizontal, and with the upper jaw somewhat longer. Eyes very close together, very prominent, with the outer eyelid very well developed. Teeth conical, in both jaws vertical. Two dorsal fins, the anterior with flexible spines in variable number; caudal with the lower margin obliquely truncated. A great portion of the base of the pectoral fin is enveloped in muscles, and scaly, and these extremities can be used for locomotion on firm ground. Ventrals more or less united. Gill-openings rather narrow; branchiostegals five; air-bladder absent, pseudobranchiæ rudimentary; a slit behind the fourth gill.

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* 1. Periophthalmus fuscatus, *Blyth in Journ. As. Soc. Beng.* 1859, p. 271.—Andaman Islands.

A tropical genus: inhabitants of the coasts and of fresh waters near the sea. West Africa; from the Red Sea and the Seychelles to the Islands of the Western Pacific, and from the coasts of China and Japan to those of North-west Australia.

These fishes are able to progress out of the water on humid places and to hunt after their prey, which consists of terrestrial insects, &c.

1. Periophthalmus koelreuteri.

Valent. iii. p. 391. fig. 140; *Renard*, i. 16. 65; *Seba*, iii. 29. 17; *Koelreuter in Nov. Comm. Petrop.* viii. p. 421.
? Gobius barbarus, *L. Gm.* i. p. 1201; *Bl. Schn.* p. 70.
Gobius koelreuteri, *Pall. Spicil.* viii. p. 8. tab. 2. fig. 1.
Periophthalmus koelreuteri, *Bl. Schn.* p. 65.

B. 5. D. 10–15 | 12. A. 11. L. lat. 90–100. Vert. 11/15.

The second dorsal fin with a black, generally white-edged longitudinal band in its upper half. The first dorsal not, or sometimes, in young individuals, only slightly, produced. About twenty teeth in each jaw. Ventrals separated from each other in adult and immature specimens.

Var. *a*. P. KOELREUTERI.

SYN.—Periophthalmus koelreuteri, *Cuv. & Val.* xii. p. 181; *Rüpp. N. W. Fische*, p. 140.
—— kalolo, *Less. Voy. Coq. Zool.* ii. p. 146; *Bianconi, Spec. Moss.* p. 253.

Light olive-brown, with silvery and brown dots, the former prevalent on the head, the latter on the sides of the body. The first dorsal blackish-violet, with a black band near, and parallel to, the margin, which is white; a few whitish spots posteriorly on the base. The lower half of the second dorsal and the interior surface of the ventrals white-dotted; pectoral and caudal with brown dots.

From the Red Sea and the Seychelles to the coasts of Australia and the Islands of the Western Pacific.

a. Three inches long. Ceylon. From the Collection of Messrs. von Schlagintweit.—This specimen has the first dorsal spine produced beyond the membrane.

b–e. Three to four inches long. India. Presented by G. R. Waterhouse, Esq.—The differences in the structure of the first dorsal fin appear to be quite accidental in the individuals, and are to be observed even in very young specimens. Two of the present four have the first dorsal spine slightly produced beyond the membrane, like specimen *a*; in the third, the first dorsal is rounded, as in adult specimens with twelve spines; in the fourth it is injured.

f. Adult. Philippine Islands.

g. Young. Port Essington. From the Haslar Collection.
h–l. Two to three inches long. North Australian Expedition. Presented by Dr. J. R. Elsey.—None have a dorsal spine produced.
m. Young.

Var. *β*. P. DIPUS.

SYN.—Periophthalmus koelreuteri, *Bleek. Blenn. en Gob.* p. 252.
—— dipus, *Bleek. Banten,* p. 320.

Light olive-brown, with the dark spots on the back (which occur also in the other varieties) more distinct; head with numerous, body with scattered bluish dots. The spinous dorsal violet, brown in the middle, white-spotted inferiorly.

Coasts of Java, West Sumatra, and Floris.

Var. *γ*. P. ARGENTILINEATUS.

SYN.—Periophthalmus argentilineatus, *Cuv. & Val.* xii. p. 191; *Bleek. Amboina & Ceram,* p. 276.
? Periophthalmus kallopterus, *Bleek. Amboina,* iv. p. 342.

Light olive-brown, with indistinct darker spots on the back; head with silvery specks; silvery vertical streaks along the lower side of the body and tail. The first dorsal blackish-violet, with a black band near, and parallel to, the margin, which is transparent; the remainder of the fin sometimes entirely white-spotted. The lower half of the soft dorsal and the interior surface of the ventrals white-dotted; pectoral and caudal with brown dots.

Irawaddy; East Indian Archipelago; Feejee Islands; Waigiou.

The largest of the specimens is four inches and one-third long.

a. Half-grown: not good state. Java.
b. Adult. Amboyna. Purchased of Mr. Frank.
c, d–e. Half-grown and young. Borneo.
f, g–i. Half-grown. Feejee Islands.

Var. *δ*. P. MODESTUS.

SYN.—? Apocryptes cantonensis, *Osbeck, Reise nach China,* p. 171.
Periophthalmus modestus, *Cant. Ann. Nat. Hist.* 1842, ix. p. 29; *Richards. Ichth. Chin.* p. 208.
—— modestus, *Schleg. Faun. Japon. Poiss.* p. 147. pl. 76. fig. 2; *Richards. Ichth. Chin.* p. 319; *Bleek. Act. Soc. Sc. Indo-Nederl.* vi., *Japan,* vi. p. 82.

Light olive-brown; head with silvery, body with brown specks. The first dorsal blackish, with a more or less distinct oblong black spot near the margin; the black band on the second dorsal generally not white-edged; the other fins, except the anal, brown-dotted; caudal and anal sometimes blackish, with light margins.

Coasts of China and Japan.

The largest specimen is three inches long.

a. Half-grown. Ningpo. Purchased of Mr. Cuming.
b, c. Half-grown and young. Hong-kong. Presented by J. C. Bowring, Esq.

d. Half-grown. Chusan. From the Collection of the East India Company.—Type of Dr. Cantor's *P. modestus.*
e, f. Half-grown and young. China.
g. Half-grown. From the Haslar Collection.

Var. ε. P. PAPILIO.

SYN.—Periophthalmus papilio, *Bl. Schn.* p. 63. tab. 14; *Cuv. & Val.* xii. p. 190. pl. 353 (caudal fin bad).

Dark brown, sometimes with a few lighter spots on the sides of the head; all the fins violet-black: the first dorsal with the margin deep black, and with a lighter band parallel to the margin; the second dorsal with a longitudinal band, darker than the ground-colour and white-edged.

Coasts of Ceylon. West coast of Africa.

a, b. Adult. Ceylon. Purchased of Mr. Stevens.
c–g. Adult and half-grown. Fernando Po. From Mr. Fraser's Collection.
h. Adult. Sierra Leone. From the Collection of the Zoological Society.
i. Half-grown. Africa. Presented by W. Raddon, Esq.
k. Adult: skeleton. Fernando Po. From Mr. Fraser's Collection.

The size of the teeth varies considerably in this species, not only according to age, but in specimens of the same size and from the same locality, and even on both sides of the same individual.

Skeleton.—The skull has a very singular appearance from the form of the orbital portion of the frontal bones, which are compressed into a thin, narrow, arched lamella, and elevated above the level of the crown. The crown is slightly convex, with a low longitudinal crest along the middle, and with a sharp prominent orbital edge. The maxillary bone is styliform and nearly straight: the intermaxillary stout, not extending so far backwards as the maxillary; its posterior process is very long, rather longer than its dental portion. The mandible is of moderate length; its articular bone is nearly entirely covered by the dentary, which emits a long process posteriorly, directed upwards and united to the maxillary by membranaceous ligaments. The vomer is hammer-like, with the free edges sharp. There is an oblong and thin præorbital, and a smaller and stouter postorbital. The bones forming the bottom of the tympanic cavity are only partly ossified, large portions between them being closed by membranes. The tympanic bone is composed of two narrow lamellæ, the lower of which extends backwards to the angle of the præoperculum, which has no horizontal portion, but terminates at the angle in a short hook-like process. Beneath the lower portion of the tympanic, there is a narrow flexible bone, which must be considered as an interoperculum. The suboperculum is nearly as large as the operculum, exceedingly thin, its marginal portion being fringed; the branchiostegal next to it is similarly dilated and fringed. The base of the brain-capsule is broad and slightly convex.

The carpus is elongate. Each pubic bone is composed of two portions: an upper, convex, lamelliform, bent over towards that of the other side, and a lower for articulation with the humerus; the latter portion is conical and hollow, and attached to a broad cartilage intermediate between pubic and humerus.

There are twenty-six vertebræ; the first interhæmal is fixed to the hæmal of the fourteenth vertebra. The ribs and all the processes are feeble; those of the last two vertebræ are lamelliform.

2. Periophthalmus chrysospilos.

Bleeker, Banka, ii. p. 728.

$$\text{D. } 10 \,\Big|\, \tfrac{1}{12}. \quad \text{A. } 13. \quad \text{L. lat. } 70.$$

The second dorsal fin with a black longitudinal band along the middle. The first dorsal spine produced into a filament in the male. About forty teeth in each jaw. Bluish, dotted with yellow. The spinous dorsal fin yellow inferiorly, black superiorly and anteriorly, its margin being yellow. (*Bl.*)

Coast of Karang hadji (Banka).

3. Periophthalmus schlosseri.

Gobius schlosseri, *Pall. Spicil.* viii. pl. 1. fig. 1–4; *L. Gm.* i. p. 1201; *Lacép.* ii. p. 573; *Shaw, Zool.* iv. p. 246.
Periophthalmus schlosseri, *Bl. Schn.* p. 64; *Cuv. Règne Anim.*; *Cuv. & Val.* xii. p. 192; *Bleeker, Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* p. 39; *Cant. Catal.* p. 191; *Cuv. Règne Anim. Ill. Poiss.* pl. 81. fig. 1.
Gobius tredecim-radiatus, *Buch. Ham. Fishes of the Ganges,* p. 48.
—— septem-radiatus, *Buch. Ham. l. c.* p. 46.
—— novem-radiatus, *Buch. Ham. l. c.* p. 47. pl. 2. fig. 14.
Periophthalmus tredecim-radiatus, *Cuv. & Val.* xii. p. 189.
—— septem-radiatus, *Cuv. & Val.* xii. p. 196.
—— novem-radiatus, *Cuv. & Val.* xii. p. 196.
—— freycineti, *Cuv. & Val.* xii. p. 197; *Quoy & Gaim. Voy. Freyc. Poiss.* p. 257.
? Periophthalmus borneensis, *Bleek. Born.* i. p. 11.

$$\text{D. } 4\text{–}15 \,\Big|\, \tfrac{1}{12}. \quad \text{A. } \tfrac{1}{12}. \quad \text{L. lat. } 55.$$

A brownish or blackish band from the eye to the shoulder; two-thirds of the length of the pectoral fin scaly. *Adult* specimens with a broad black longitudinal band on the second dorsal fin, and with the ventrals nearly entirely united. *Immature* specimens with the second dorsal nearly entirely blackish, and with the ventral fins separated from each other.

East Indies.

Var. *a.* P. FREYCINETI, *Cuv. & Val.*, with four or five dorsal spines.

* Adult, with the ventral fins united.

a. Philippine Islands.

** Immature, with the ventral fins separate.

b, c. Siam. From M. Mouhot's Collection.

Var. *β.* P. SCHLOSSERI, P. SEPTEMRADIATUS, P. NOVEMRADIATUS, with seven to nine dorsal spines.

* Adult, with the ventrals united.

a, b. Singapore. Seven or eight dorsal spines.
c. Purchased of Mr. Frank. Seven dorsal spines.
d. Batavia. Eight dorsal spines.
e. Skin. Sea of Pinang. From Dr. Cantor's Collection.

** Immature, with the ventrals separate, and one of the specimens with the second dorsal spine slightly produced.

f–i. Two to three inches long. India. Purchased.

Var. *γ.* P. TREDECIMRADIATUS, with thirteen to fifteen dorsal spines.

* Adult: unknown.

** Immature, with the ventrals separate, and the second dorsal spine much produced.

a, b. Three to four inches long. Siam. From M. Mouhot's Collection.—Apparently taken with specimens *b* and *c* of Var. *a.*
c. Four inches long. India. Presented by General Hardwicke.

The number of spines and the form of the anterior dorsal fin are subject to great variation, as in *Periophthalmus koelreuteri.* The greatest differences may be observed in quite young specimens procured at the same time and from the same locality, and otherwise agreeing with one another in every respect. Whether the produced first dorsal spine, a character which nearly always coincides with a great number of spines, is a peculiarity of one sex only, I do not know, but it is very probable. Another peculiarity of this species is, that the ventral fins are separated from each other during the immature period of the fish, but are united in its adult state.

All these differences, partly accidental, partly dependent on the state of development, have been misconstrued, and have given rise to five specific denominations.

13. BOLEOPHTHALMUS*.

Boleophthalmus, *Cuv. & Val.* xii. p. 198.

Body subcylindrical, covered with very small or rudimentary scales; head oblong, with the cleft of the mouth nearly horizontal, and with the upper jaw somewhat longer. Eyes close together, very prominent, with the outer eyelid well developed. Anterior teeth much stronger than those on the sides, all in a single series; those on the side of the mandibula horizontal. Two dorsal fins: the anterior short, with five flexible spines; caudal with the lower margin more or less obliquely truncated. The basal portion of the pectoral fins is muscular and free in some of the species. Ventrals separated from each other. Gill-openings rather narrow; branchiostegals five; air-bladder absent; pseudobranchiæ, a slit behind the fourth gill.

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* 1. Boleophthalmus dentatus, *Cuv. & Val.* xii. p. 208. pl. 355.—Bombay.
2. —— campylostomus, *Richards. Ichth. Chin.* p. 209.—Canton.
3. —— laokus, *Cuv. & Val.* xii. p. 214.—Malacca.

A tropical genus: inhabitants of the coasts and of fresh waters near the sea. East Indies, northwards to China and Japan.

These fishes approach in their habits to *Periophthalmus*, especially those species which have muscular pectoral fins.

1. Boleophthalmus boddaertii.

Gobius boddærti, *Pall. Spicil.* viii. p. 11. pl. 2. figs. 4, 5; *L. Gm.* i. p. 1201; *Shaw, Zool.* iv. p. 238.
Eleotris boddærti, *Bl. Schn.* p. 66.
Gobius striatus, *Bl. Schn.* p. 71. tab. 16 (fem.).
Russell, i. p. 42. pl. 54.
Gobius plinianus, *Buch. Ham. Fish. Gang.* p. 45. pl. 35. fig. 13.
Boleophthalmus boddærti, *Cuv. & Val.* xii. p. 199; *Bleek. Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* pp. 5, 40; *Cant. Catal.* p. 192.
—— plinianus, *Cuv. & Val.* xii. p. 205.

D. $5 \mid \frac{1}{24}$. A. $\frac{1}{25}$. L. lat. 90.

Eleven longitudinal series of scales between the posterior parts of the second dorsal and of the anal. Scales on the head and back imbricate, each with a small tubercle. Body with seven brown cross-bands, descending obliquely forwards; a band of brown spots along the side of the head. The first dorsal with a few scattered bluish specks, the second with four rather irregular longitudinal series of ovate bluish-white spots; caudal brown, without lighter specks, with two blackish longitudinal stripes.

Estuaries and coasts of the East Indies. It does not appear to extend to China and Japan.

a–b. Adult. Madras. Presented by T. C. Jerdon, Esq.
c–d. Adult and half-grown. Bay of Bengal. From the Collection of the Zoological Society.
e. Adult: skin. Sea of Pinang. From Dr. Cantor's Collection.
f. Adult. India. Presented by G. R. Waterhouse, Esq.
g. Adult. India. From the Collection of the East India Company.

2. Boleophthalmus pectinirostris.

Apocryptes chinensis, *Osbeck, Amœn. Acad.* iv. pl. 3. fig. 3, and *Voy. Chin.* p. 200 (*Reise nach China*, p. 170).
Gobius pectinirostris, *L. Gm.* i. p. 1200; *Bl. Schn.* p. 70; *Lacép.* ii. p. 542; *Shaw, Zool.* iv. p. 245.

Apocryptes pectinirostris, *Cuv. & Val.* xii. p. 150.
Boleophthalmus pectinirostris, *Richards. Ichth. Chin.* p. 208; *Cant. Catal.* p. 193.
—— boddærtii, *Richards. l. c.*; *Faun. Japon. Poiss.* p. 148. pl. 76. fig. 3.

$$D.\ 5 \,\Big|\, \frac{1}{23}.\quad A.\ \frac{1}{23}.\quad \text{Vert. } 11/14.$$

Scales anteriorly exceedingly small, becoming somewhat larger posteriorly; seventeen longitudinal series of scales between the posterior parts of the second dorsal fin and of the anal. Head and back finely tubercular. Tail, below the second dorsal fin, with three more or less indistinct brown cross-bands, descending obliquely forwards, and forming two dark spots on the base of the second dorsal; a band of brown spots along the side of the head. The first dorsal densely dotted with bluish, the second with four to six longitudinal series of oblong spots; caudal with ovate whitish spots between the rays.

Coasts of Pinang, China, and Japan.

a. Adult: skin. Pinang. From Dr. Cantor's Collection.
b. Adult: bad state. Molucca Sea. Purchased of Mr. Frank.
c. Adult. China. Presented by J. R. Reeves, Esq.
d. Adult. Amoy. Purchased.
e. Adult. From the Collection of the Zoological Society.
f. Adult. From the Haslar Collection.
g. Adult: skeleton. Ningpo. Purchased of Mr. Cuming.

Skeleton.—The skull resembles in its general appearance that of *Periophthalmus*, the bony bridge between the orbits being likewise compressed into a very narrow lamella which is elevated above the level of the crown. The crown is flat, with a low longitudinal crest along the middle, and slightly ascending towards the orbital margin. The maxillary bone is styliform and straight; the intermaxillary extends as far backwards as the maxillary, and has the posterior process very short. The mandible is flattened, with the dentigerous edge turned outwards. The head of the vomer has a slight prominence on each side, and a notch between; its posterior portion is exceedingly narrow. There is a wide opening in the tympanic cavity, between the two portions of which the tympanic is composed. The præoperculum has a short horizontal limb, below which is situated a very small interoperculum. The suboperculum is very large and thin, like the marginal portion of the operculum. None of the branchiostegals are dilated. The base of the brain-capsule is broad and flat.

The carpus is rather elongate, but less than in *Periophthalmus*. The pubic bones are small, triangular, concave; a broad cartilage, larger than the pubic bones, serves for their connexion with the humeral arch.

There are eleven abdominal and fourteen caudal vertebræ, the length of the former division of the vertebral column being to that of the caudal as 1 : 1·15. Ribs, neural, hæmal, interneural and interhæmal spines feeble.

3. Boleophthalmus dussumieri.

Cuv. & Val. xii. p. 207. pl. 354.

$$D.\ 5 \,\Big|\, \tfrac{1}{27}. \quad A.\ \tfrac{1}{25}.$$

Scales extremely small (?); head and back finely granular. The length of the head is contained five times and a half in the total. The two front teeth of the lower jaw strongly curved upwards. Greyish-violet (in spirits): head, pectoral, and anterior part of the body brown-dotted; the anterior dorsal blackish, with black dots, the posterior with white spots irregularly arranged; caudal blackish, with whitish margins. (*Val.*)

Coast of Bombay.

4. Boleophthalmus sculptus.

D. 5 | 25. A. 22.

Head and anterior part of the body without imbricate scales, but with flat round tubercles, which on the upper part of the head and on the nape have a slight impression in the centre, whilst those on the sides are quite flat, giving the appearance of mosaic-work. The scales become more distinct on the tail, and there are eight longitudinal series of them between the extremities of the dorsal and anal fins. The height of the body is contained six times and a half in the total length, the length of the head four times and a half. Anterior teeth of the upper jaw slightly enlarged, those of the lower very small and horizontal. Base of the anterior dorsal of moderate length, its third spine filiform. Caudal rhomboid, of moderate length; anal much lower than the opposite dorsal fin. More than one-half of the pectoral is enveloped in scales.

India.

a. Fifty lines long. India. Presented by General Hardwicke.

A coloured figure of the actual specimen exists in the collection of drawings of General Hardwicke, preserved in the British Museum. Body greenish-olive, yellowish on the belly; six rather indistinct darker bands descend obliquely from the back towards the belly; the anterior dorsal greyish, the other fins reddish. The specimen is not in a very good state of preservation.

5. Boleophthalmus viridis.

Gobius viridis, *Buch. Ham.* pp. 42, 45, 366. pl. 32. fig. 12.
Boleophthalmus viridis, *Cuv. & Val.* xii. p. 213; *Cant. Catal.* p. 195.
—— histophorus, *Cuv. & Val.* xii. p. 210.
? Boleophthalmus sinicus, *Cuv. & Val.* xii. p. 215.
? Boleophthalmus chinensis, *Cuv. & Val.* xii. p. 215.
Boleophthalmus aucupatorius, *Richards. Voy. Sulph. Fishes*, p. 148. pl. 62. figs. 1, 2, and *Ichth. Chin.* p. 208.

$$D.\ 5 \,\Big|\, \tfrac{1}{26}. \quad A.\ \tfrac{1}{25}.$$

Size of scales microscopical. Anterior dorsal very short, but high.

Greenish: back with scattered black dots; sometimes a series of vertical bands along the lower half of the side; base of the pectoral dark-coloured; caudal pointed, with transverse series of blackish dots.

Coasts of the East Indies.

a. Adult: skin. Sea of Pinang. From Dr. Cantor's Collection.
b, c. Half-grown. China. Presented by Sir J. Richardson.—Types of *B. aucupatorius.*

14. ELEOTRIS*.

Eleotris, pt., *Gronov. Mus. Ichthyol.* p. 16.
Eleotris, *Cuv. Règne Anim.*; *Cuv. & Val.* xii. p. 216.
Philypnus, *Cuv. & Val.* xii. p. 255.
Bostrichthys, (*Dumér.*) *Gill, Proc. Acad. Nat. Sc. Philad.* 1860, p. 124.
Culius, *Bleek. Boeroe,* p. 411.
Butis, *Bleek. Boeroe,* p. 412.
Valenciennea, *Bleek. Boeroe,* p. 412.
Belobranchus, *Bleek. Bali,* p. 300.
Eleotriodes, *Bleek. Goram,* p. 212.
Lembus, *Gthr. Acanthopt.* i. p. 505.

Body subcylindrical, scaly; head oblong; eyes of moderate size, lateral, not prominent. Teeth small. Two dorsal fins: the anterior with six, sometimes with seven or eight (five) spines. Pectorals with the base not particularly muscular; ventrals not united, with the space between them narrow, and with one spine and five rays. Gill-openings of moderate width; branchiostegals five or six (four); air-bladder large; pseudobranchiæ, a slit behind the fourth gill. Anal papilla distinct.

Freshwater fishes of the tropics, living at the bottom, some of the species entering the sea. The most northern form occurs in Japan, the most southern one in New Zealand.

Not one of the genera mentioned above has been founded on such characters that it would comprise those species which show the greatest natural affinity to one another. For instance, *E. guavina, belobrancha, sinensis, urophthalmus,* and the other species with an ocellus on the tail, are more closely allied to one another than to any of the other species; nevertheless they have been referred to three different genera, which would comprise species like *E. ophiocephalus*, *gyrinus*, &c. I prefer, therefore, to arrange them according to their natural affinities, without creating unnecessary denominations.

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* 1. Eleotris acanthopomus, *Bleek. Sumatra,* ii. p. 275.—West Sumatra.
2. —— radiata, (*Quoy & Gaim.*) *Cuv. & Val.* xii. p. 250.—New Zealand.
3. —— wolffii, *Bleek. Blenn. en Gob.* p. 253.—Bandjermassing.
4. —— melanurus, *Bleek. in Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* p. 21.—Eastern Java.
5. —— viridis, *Bleek. l. c.* p. 22.—Madura.
6. —— prismatica, *Bleek. l. c.* p. 23.—Madura.
7. —— gymnopomus, *Bleek. Sumatra,* ii. p. 274.—West Sumatra.
8. —— somnolentus, *Girard, Proc. Acad. Nat. Sc. Philad.* 1858, p. 169.—Mouth of the Rio Grande del Norte.
9. —— flammans, *Cant. Ann. & Mag. Nat. Hist.* ix. p. 484.—Chusan.
10. —— trabeatus, *Richards. Ic. Pisc.* p. 5. pl. 2. fig. 2.—Depuch Island.
11. —— longipinnis, *Benn. in Zool. Beech. Voy.* p. 64. pl. 20. f. 3.—Loo-Choo.
12. Atherina danius, *Buch. Ham. Fish. Gang.* p. 222.—Cestreus minimus, *M'Clell. Calc. Journ. Nat. Hist.* ii. p. 151. pl. 4. fig. 2.—Ganges.

Synopsis of the Species.

A. Scales of moderate size, less than fifty in a longitudinal series.

I. Snout short, broad, flat, depressed, the form of the head approaching that of Ophiocephalus: *Eleotris* (part.), Bleek.

1. E. ophiocephalus.
2. E. cantoris (porocephalus).
3. E. porocephaloides.
4. E. aporos.
5. E. hoedtii (tolsoni).
6. E. macrolepidota.
7. E. madagascariensis.
8. E. mogurnda.
9. E. maculata.
10. E. grandisquama.
11. E. sima.

II. Snout of moderate length, the form of the head approaching that of Gobius (giuris).

1. No black spot on the root of the pectoral: *Eleotris* (part.), Bleek.

12. E. gobioides.
13. E. obscura.
14. E. oxycephala.
15. E. hasseltii.

2. A black spot on the root of the pectoral: *Butis*, Bleek.

16. E. butis.
17. E. amboinensis.
18. E. melanostigma.
19. E. caperata.

III. Head and body rather compressed, similar in form to a Cyprinoid: *Eleotris* (part.), Bleek.

20. E. cyprinoides.
21. E. leuciscus.
22. E. tænionotoptera.
23. E. cyanostigma.

B. Scales small, fifty and more in a longitudinal series.

I. Less than twenty rays in the soft dorsal and anal fins.

1. None of the rays produced into a filament.

a. No ocellated spot on the base of the caudal.

α. None of the bones of the head armed.

aa. Vomerine teeth: *Philypnus*, Val.

24. E. dormitatrix.
25. E. lembus.
26. E. lateralis.

bb. Palate entirely smooth: *Eleotris* (part.), Bleek.

27. E. gyrinus.
28. E. smaragdus.
29. E. fornasini.
30. E. gyrinoides.
31. E. marmorata.
32. E. guavina.
33. E. canina.
34. E. periophthalmus.

β. A spine at the angle of the præoperculum: *Culius*, Bleek.

35. E. fusca (pseudacanthopoma).
36. E. melanosoma.

γ. Some of the branchiostegals terminating in a spine anteriorly: *Belobranchus*, Bleek.

37. E. belobrancha.
38. E. tænioptera.

b. An ocellated spot on the base of the caudal fin.

α. Vomerine teeth: *Bostrichthys*, Gill.

39. E. sinensis.

β. Palate entirely smooth: *Eleotris* (part.), Bleek.

40. E. urophthalmus. 41. E. urophthalmoides. 43. E. macrodon.
42. E. siamensis.

2. Some of the dorsal spines produced into filaments: *Valenciennea*, Bleek., or *Eleotriodes* (part.), Bleek.

44. E. muralis. 45. E. sexguttata. 46. E. strigata.

3. Some of the caudal rays produced into filaments: *Eleotriodes* (part.), Bleek.

47. E. helsdingenii.

II. More than twenty rays in the soft dorsal and anal fins: *Eleotriodes* (part.), Bleek.

48. E. heteroptera. 49. E. microlepis.

A. Scales of moderate size, less than fifty in a longitudinal series.

I. Snout short, broad, flat, depressed, the form of the head approaching that of Ophiocephalus: *Eleotris* (part.), Bleek.

1. Eleotris ophiocephalus.

Eleotris ophiocephalus, (*Kuhl & v. Hass.*) *Cuv. & Val.* xii. p. 239; *Bleek. Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* p. 22; *Cantor, Catal.* p. 196.
—— porocephalus, *Cuv. & Val.* xii. p. 237 (not *Cant.* or *Bleek.*).
—— margaritacea, *Cuv. & Val.* xii. p. 240.

D. $6 \mid \frac{1}{8}$. A. $\frac{1}{7}$. L. lat. 34–36. Vert. 12/14.

Twelve series of scales between the origin of the posterior dorsal fin and the anal. Head entirely scaly, except the foremost part of the snout; scales on the upper surface of the head rather larger than those on the body. The height of the body is one-sixth of the total length, the length of the head one-fourth. Head obtuse, flat, depressed. The diameter of the eye is one-fifth of the length of the head, two-thirds of that of the snout, and four-ninths of the width of the interorbital space. The cleft of the mouth extends to below the middle of the eye. Teeth in villiform bands. Brownish: the scales with a rather darker centre; irregular series of pearl-coloured spots along the lower part of the sides, sometimes disappearing in preserved specimens; vertical fins with whitish margins, the second dorsal and the caudal with light spots.

Fresh waters of the Seychelles and New Ireland. Sea of Pinang. East Indian Archipelago. Philippines.

a. Adult: skin. Sea of Pinang. From Dr. Cantor's Collection.—Type of *E. ophiocephalus*, Cant.
b. Adult: bad state. Moluccas. Purchased of Mr. Frank.
c. Adult. Amboyna.
d. Half-grown. Amboyna.
e. Adult. Borneo.
f. Adult. Philippine Islands.
g. Adult male: skeleton. Amboyna. Purchased of Mr. Frank.

Skeleton.—The skull is very broad and depressed, the crown quite flat, with a short and low occipital crest posteriorly; the interorbital space is broad. The maxillary bone is curved, sabre-shaped, rather dilated towards its extremity. The intermaxillary has the posterior processes short, and its extremity dilated; it does not extend so far backwards as the maxillary. The mandible is strongly bent, the dentary bones forming a broad anterior portion. The vomer is broad and flat; infraorbital ring complete, but feeble. The bones forming the tympanic groove are more ossified than in *Gobius*, the tympanic bone having the same form as in the species of that genus, and leaving the same large free space closed only by a membrane between its two portions. The præoperculum has a double free edge, enclosing a muciferous channel; interoperculum small; suboperculum rather large, subcrescentic; none of the branchiostegals dilated. The base of the brain-capsule is exceedingly broad and very slightly convex.

Glossohyal broad and triangular; urohyal more elongate.

The bones of the humeral arch are remarkably thin and feeble.

There are twelve abdominal and fourteen caudal vertebræ: in this species the former portion of the vertebral column is longer than the caudal, which is of rare occurrence in this order of fishes; the ratio is 1·16 : 1. The ribs are strong, suspended from long parapophyses; the neural, hæmal, interhæmal and interneural spines are feeble.

	lines.
Length of the first vertebra	$1\frac{1}{2}$
——— of the fifth vertebra	$2\frac{1}{4}$
——— of the twelfth vertebra	2
——— of the sixteenth vertebra	$1\frac{3}{4}$
——— of the twenty-fifth vertebra	$1\frac{1}{3}$
——— of the abdominal portion.	25
——— of the caudal portion	$21\frac{1}{2}$

2. **Eleotris cantoris.**

Eleotris porocephalus, *Cant. Catal.* p. 195; *Bleek. Amboina,* iv. p. 344 (not *Cuv. & Val.*).

D. 6 | $\frac{1}{8}$. A. $\frac{1}{7}$. L. lat. 36–37.

Twelve series of scales between the origin of the posterior dorsal and the anal. Head entirely scaly, except the foremost part of the snout; scales on the upper surface of the head smaller than those on the side of the body, there being about twenty-two or twenty-three transverse series between the snout and the first dorsal fin. The height of the body is contained five times and a half or six times in the total length, the length of the head three times and three-quarters or four times. Head obtuse, flat, depressed. The diameter of the eye is one-fifth or one-sixth of the length of the head, two-thirds of that of the snout, and about one-half of the width of the interorbital space. The cleft of the mouth extends beyond the vertical from the centre of the eye. Teeth in villiform bands. Brownish, marbled with darker; posterior dorsal and caudal brown-spotted; anal transparent.

Fresh waters of Pinang, Amboyna, Ceram, Celebes, and Nias.

a, b. Adult: skins. Pinang.—Types of Dr. Cantor's description.

This fish is readily distinguished from *E. porocephalus*, Cuv. & Val., by the considerably smaller scales of the neck. The latter is doubtless identical with *E. ophiocephalus*, Kuhl & v. Hass.

3. Eleotris porocephaloides.

Bleek. Sumatra, iii. p. 511.

B. 6. D. $6 \mid \frac{1}{8}$. A. $\frac{1}{6}$. L. lat. 33.

Head entirely scaly, except the foremost part of the snout. Scales ctenoid. The height of the body is contained six times in the total length, the length of the head three times and three-fourths. Head obtuse, flat, depressed. [The diameter of the eye is one-fourth of the length of the head, in an immature specimen.] The maxillary reaches to below the posterior half of the eye. Teeth in villiform bands. Brownish, with some indistinct lighter transverse bands; the vertical fins black, with the margins red. (*Bl.*)

Rivers of Priaman.

4. Eleotris aporos.

Eleotris aporos, *Bleek. Gilolo*, p. 49.

D. $6 \mid \frac{1}{8}$. A. $\frac{1}{(8)\,9}$. L. lat. 32–38. Vert. 12/13.

Ten or eleven longitudinal series of scales between the origin of the second dorsal and the anal. Head entirely scaly, except the foremost part of the snout; scales on the upper surface of the head rather larger than those on the body. Scales minutely ciliated. The height of the body is contained four times to five times and a half in the total length, the length of the head four times. Head obtuse, flat, depressed. The eye occupies the third seventh of the length of the head, and its diameter is one-third of the width of the interorbital space (in adult specimens). The maxillary extends to the vertical from the anterior margin of the eye. Teeth in villiform bands. Brownish-olive (in spirits), with one or two rows of darker spots along the side; three oblique streaks from the eye to the opercles, the upper leaving a spot on the base of the pectoral. Fins blackish; the second dorsal and the anal with white margin.

Coasts of Gilolo and Ternate. Fresh waters of the Feejee Islands. Borneo; Amboyna.

a. Fine specimen. Borneo. Purchased of Mr. Frank as *E. porocephalus*.

b, c–d. Adult and half-grown. Fresh waters of Oualan.

e, f–g. Adult and half-grown. Feejee Islands.

h. Adult. Wanderer Bay (fresh water). From the Museum of Economic Geology.

i. Twelve inches long: stuffed. Fresh waters of Aneiteum. From Mr. Macgillivray's Collection.
k. Adult. Purchased of Mr. Frank.
l. Adult male: skeleton. Amboyna. Purchased of Mr. Frank.

A very fine variety or, perhaps, species is represented by a single specimen: many of the lateral scales have a large silvery spot; three or four series of silvery specks radiate from the eye towards the root of the pectoral and the gill-opening. The vertical and ventral fins with round white spots.

a. Fine specimen. Fresh waters of Oualan. Voyage of the 'Herald.'

Skeleton.—The skull is very similar in structure and form to that of *E. ophiocephalus*; the crown is broad, rather convex, with a pair of low, parallel, distant crests anteriorly, and with its posterior portion elevated above the level of the interorbital space, which is exceedingly broad and somewhat concave. The præoperculum has a double ridge on its ascending portion only, the margin of its horizontal limb being simple. There are twelve abdominal and thirteen caudal vertebræ, the length of the former portion of the vertebral column being to that of the caudal as 1·24 : 1.

	lines.
Length of the first vertebra	$2\frac{1}{3}$
——— of the fifth vertebra	$2\frac{2}{3}$
——— of the twelfth vertebra	$2\frac{1}{4}$
——— of the sixteenth vertebra	2
——— of the twenty-fourth vertebra	$1\frac{2}{3}$
——— of the abdominal portion	31
——— of the caudal portion	25

5. Eleotris hoedtii.

Bleek. Amboina, v. p. 496.

D. $6 \mid \frac{1}{8}$. A. $\frac{1}{9}$. L. lat. 25.

Head entirely scaly, except the foremost part of the snout; scales on the upper surface of the head not smaller than those on the body. The height of the body is contained five times and a half in the total length, the length of the head four times and two-fifths. Head obtuse, flat, depressed. The diameter of the eye is contained five times and a half in the length of the head, and twice and a quarter in the width of the interorbital space. The lower jaw is longer than the upper, and the maxillary extends to, or nearly to, the vertical from the anterior margin of the orbit. Teeth in villiform bands. Brownish-green, with a darker longitudinal band; two brownish bands from the eye towards the suboperculum; fins brownish, caudal with red margin; the anterior dorsal with two or three deep-violet bands, the posterior with violet spots. (*Bl.*)

Rivers of Amboyna, Booroo, Timor, and Nias.

Eleotris tolsoni (Bleek. Natuurk. Tydschr. Nederl. Ind. 1854, p. 542), from fresh waters of Western Java, does not appear to differ materially from the above species.

6. Eleotris macrolepidota.

Sciæna macrolepidota, *Bl.* taf. 298; *Bl. Schn.* p. 80.
Eleotris tumifrons, *Cuv. & Val.* xii. p. 241.

D. 7 | $\frac{1}{8}$. A. $\frac{1}{10}$. L. lat. 30.

The scales on the upper surface of the head are much smaller than those on the body. Scales minutely ciliated. Interorbital space swollen. The height of the body equals the length of the head and of the caudal fin, and is nearly one-fourth of the total. The eye occupies the second quarter of the length of the head, and its diameter is nearly one-third of the width of the interorbital space. The maxillary extends to the vertical from the anterior margin of the orbit. Teeth villiform. Colours?

East Indies.

The typical specimen is in the Berlin Museum.

7. Eleotris madagascariensis.

Cuv. & Val. xii. p. 240.

D. 6 | 9. A. 7. L. lat. 40.

Teeth cardiform, those of the outer series stronger. Fins elongate. Black: the second dorsal and the caudal with brownish dots. (*Val.*)

Madagascar.

8. Eleotris mogurnda.

Richards. Voy. Ereb. & Terr. Fishes, p. 4. pl. 2. figs. 1, 2.

D. 8 | $\frac{1}{12\text{–}13}$. A. $\frac{1}{13}$. L. lat. 48.

Præoperculum without spine. Fifteen series of scales between the origin of the posterior dorsal and the anal. The scales on the upper surface of the head are not smaller than those on the sides. Head scaly, except the snout. Scales minutely ciliated. The height of the body is contained five times in the total length, the length of the head three times and three-quarters. The horizontal diameter of the eye is one-sixth of the length of the head, or one-half the width of the interorbital space. Snout of moderate length, rather depressed, with the lower jaw prominent; the maxillary extends nearly to the vertical from the anterior margin of the eye. Teeth villiform, in broad bands. A series of dark-brown spots along the middle of the side; three oblique, narrow brown stripes from the eye to the gill-opening, the upper one reaching on the base of the pectoral fin.

Port Essington.

a, b. Port Essington. From the Haslar Collection.—Types of the species.

c. Port Essington. Purchased of J. Gould, Esq.

d. Stuffed: bad state.

9. **Eleotris maculata.**

Sciæna maculata, *Bl.* taf. 299. fig. 2; *Bl. Schn.* p. 80.
Eleotris mugiloides, *Cuv. & Val.* xii. p. 226.
—— latifrons, *Richards. Voy. Sulph. Fishes*, p. 57. pl. 35. figs. 4, 5 (the humeral spot is omitted).

D. $7 \left| \frac{1}{8\,(9)} \right.$. A. $\frac{1}{9\text{–}10}$. L. lat. 30–35. Vert. 13/15 (11/15 *Val.*).

Nine or ten series of scales between the origin of the second dorsal and the anal. The scales on the upper surface of the head are of moderate size, though smaller than those on the body, and extend to the extremity of the snout, those on the side of the head to the præorbital. Scales minutely ciliated. The height of the body is contained four times or four times and a half in the total length, the length of the head three times and three-quarters. Head obtuse, thick. The upper profile of the snout descending obliquely downwards in a nearly straight line. The eye occupies the third sixth of the length of the head, and its diameter is not quite one-third of the width of the interorbital space. The maxillary extends to the vertical from the anterior margin of the orbit. Teeth villiform, slightly moveable, forming narrow bands. Caudal rather large, rounded, as long as the head. Greenish-olive, indistinctly clouded with darker; cheek with two or three indistinct longitudinal stripes; a black spot on the shoulder. The second dorsal and anal with series of dark spots.

Fresh waters of the West Indies, (Martinique), Trinidad, Mexico, Demerara, Surinam, Guayaquil.

a. Adult: skin. West Indies. Purchased of Mr. Scrivener.
b–g. Adult and half-grown: stuffed. West Indies. From Dr. Parnell's Collection.
h. Adult: stuffed. Trinidad. Presented by J. B. Richardson, Esq.
i–o. Adult. Guayaquil. From Mr. Fraser's Collection.
p. Adult. Pacific. Presented by Captain Sir E. Belcher, C.B.—Type of *Eleotris latifrons*, Richards.
q. Adult: skin.
r–s, *t–w*. Adult. From the Haslar Collection.
x. Adult: skeleton. Guayaquil. From Mr. Fraser's Collection.

The following specimens, with shorter head and caudal fin, belong perhaps, to a different species.

E. somnu-
lenta

a. Adult. South (? Central) America. From M. Sallé's Collection. The length of the head equals that of the caudal, and is contained four times and a half in the total. Anterior dorsal with six spines.
b. Adult. Demerara. Presented by Sir A. Smith.
c. Adult. Purchased of M. Parzudaki.

Skeleton.—The skull of this species is much more elevated than in *E. ophiocephalus* and *E. aporos*, being as high as broad. The crown of the head is convex on the middle, with a longitudinal impression on each side: the convex and the concave portions are not separated by a crest; there is only a low and feeble crest on the occiput. The principal frontal bones have a transverse impression between the posterior angles of the orbit, are moderately broad between the orbits, and again elevated and forming a convexity above the ethmoid. The upper portion of the orbital incisure is deep, as broad as long. Bones of the jaws feeble. The præoperculum has a double ridge along the posterior margin, the lower margin being simple. Operculum and suboperculum large, elongate. The urohyal is slender, terminating in a long point posteriorly. The pubic bones form a square lamella together, and each is joined to the humerus of its side.

There are thirteen abdominal and fourteen caudal vertebræ, the former portion being a little longer than the caudal. The ribs and the processes are moderately developed.

	lines.
Length of the first vertebra	$1\frac{1}{3}$
——— of the fifth vertebra	2
——— of the thirteenth vertebra	$1\frac{2}{3}$
——— of the nineteenth vertebra	$1\frac{1}{2}$
——— of the twenty-sixth vertebra	$1\frac{1}{4}$
——— of the abdominal portion	$21\frac{2}{3}$
——— of the caudal portion	$19\frac{1}{3}$

10. Eleotris grandisquama.

Cuv. & Val. xii. p. 229.

D. 6 | $\frac{1}{8}$. A. $\frac{1}{9}$. L. lat. 30.

The scales on the upper surface of the head are as large as those on the body. The height of the body is one-fifth of the total length, the length of the head one-fourth. Head obtuse, thick, depressed. The eye occupies the second fifth of the length of the head, and its diameter is one-half of the width of the interorbital space. The maxillary scarcely extends to the vertical from the anterior margin of the eye. Teeth villiform. Brownish; the second dorsal and the anal with blackish spots. (*Val.*)

Tropical America?

11. Eleotris sima.

Cuv. & Val. xii. p. 232.

D. 8 | 9. A. 10. L. lat. 32.

Snout obtuse, with the anterior profile subvertical; the lower jaw projects a little beyond the upper. Eye small. Dark greenish; fins with the rays brown-dotted. (*Val.*)

Fresh waters of Vera Cruz.

The species has been founded on specimens three inches long, and appears to be distinguished by the number of the dorsal spines. A specimen received from Paris as *E. sima*, is identical with *E. maculata*.

II. Snout of moderate length, the form of the head approaching that of Gobius (giuris).

1. No black spot on the root of the pectoral: *Eleotris* (part.), Bleek.

12. Eleotris gobioides.

Eleotris gobioides, *Cuv. & Val.* xii. p. 247; *Richards. Voy. Ereb. & Terr. Fishes,* p. 4. pl. 2. figs. 5, 6; *Jenyns, Zool. Beagle, Fishes,* p. 98.
—— basalis, *Gray, Zool. Misc.* 1842, p. 73.

D. $6 \mid \frac{1}{10}$. A. $\frac{1}{9\text{–}10}$. L. lat. 36. Vert. 13/15.

Præoperculum without spine. Ten or eleven series of scales between the origin of the second dorsal fin and the anal. The scales on the nape of the neck are of moderate size, and do not extend over the interorbital space; those on the cheek minute. Scales not ciliated. The height of the body is contained five times and a half in the total length, the length of the head three times and three-quarters. The horizontal diameter of the eye is one-sixth of the length of the head, or one-half of the width of the interorbital space. Snout of moderate length, with the lower jaw prominent, and with the cleft of the mouth oblique; the maxillary extends somewhat beyond the vertical from the anterior margin of the eye. Teeth villiform, in broad bands. Blackish-brown, with the fins blackish; a white vertical band across the root of the pectoral fin, very distinct in immature specimens, indistinct or absent in adult ones.

Coasts and fresh waters of New Zealand.

a–g. Adult and half-grown. Bay of Islands. From the Haslar Collection.
h, i. Half-grown. River Thames (New Zealand). From Dr. Dieffenbach's Collection.—Types of *E. basalis.*
k–o. Young. Lake Maiken (Antarctic Expedition).
p. Many adult, half-grown, and young specimens. All from New Zealand.
q. Adult: skeleton. New Zealand. From the Haslar Collection.

The *skeleton* of this species differs only in some minor points from those described. The crown of the head is broad, slightly convex, without crests, except a very feeble one on the occipital. The frontals are moderately broad between the orbits, and have the orbital edge somewhat elevated. The infraorbital ring is indicated by a small præorbital and a rudimentary postorbital. The præfrontals do not project much on the sides of the head. The bones of the jaws are stout; vomer hammer-shaped; urohyal subtriangular.

There are thirteen abdominal and fifteen caudal vertebræ, both portions being equal in length. Ribs rather strong, suspended from long parapophyses, and with the epipleurals well developed. The other processes of moderate length and strength.

	lines.
Length of the first vertebra	$1\frac{2}{3}$
——— of the fifth vertebra	$1\frac{3}{4}$
——— of the thirteenth vertebra	$1\frac{3}{4}$

	lines.
Length of the nineteenth vertebra	$1\frac{1}{2}$
——— of the twenty-seventh vertebra	$1\frac{1}{2}$
——— of the abdominal portion	23
——— of the caudal portion	23

13. Eleotris obscura.

Schleg. Faun. Japon. Poiss. p. 149. pl. 77. figs. 1–3.

$D.\ 7 \mid \frac{1}{8}.\quad A.\ \frac{1}{7}.\quad L.\ lat.\ 36\text{–}40.$

Præoperculum without spine. Twelve or thirteen series of scales between the origins of the second dorsal and the anal fins. The scales on the neck are of moderate size, gradually becoming smaller anteriorly; they do not extend on the snout. Scales not ciliated. The height of the body is contained five times or five times and a half in the total length, the length of the head three times and a quarter. The eye occupies the third eighth of the length of the head, and its vertical diameter is one-third of the width of the interorbital space. Head broad, depressed, with the snout of moderate length, and with the lower jaw prominent; the maxillary extends beyond the vertical from the centre of the eye. Teeth card-like, in broad bands. Brown clouded with darker; fins brown-spotted.

Rivers of Nagasaki. China.

a, b. Adult. Japan.
c. Fine specimen. Chikiang. From Mr. Fortune's Collection.

14. Eleotris oxycephala.

Eleotris oxycephala, *Schleg. Faun. Japon. Poiss.* p. 150. pl. 77. figs. 4, 5.
—— cantherius, *Richards. Ichth. China*, p. 209.

$D.\ 6 \mid \frac{1}{8}.\quad A.\ \frac{1}{8}.\quad L.\ lat.\ 48.$

Præoperculum with a spine directed downwards. Thirteen series of scales between the origin of the second dorsal fin and the anal. The scales on the head are small and extend on to the snout; those on the cheeks are minute. Scales minutely ciliated. The height of the body is one-sixth of the total length, the length of the head one-fourth. The eye occupies the third eighth of the length of the head, and is one-third of the width of the interorbital space. Snout depressed, of moderate length, with the lower jaw prominent; the maxillary does not quite extend to the vertical from the centre of the eye; teeth villiform, forming bands. Brownish, with scattered darker dots and lighter stripes along the series of scales; the lower parts minutely dotted with brown, and the lower part of the head with round white spots; fins with serrated brown bands.

China and Japan.

a, b. Adult and half-grown. China.
c, d. Fine specimens. From the Haslar Collection.

15. Eleotris hasseltii.

Bleek. Blenn. en Gob. p. 253 cum fig., and *Boeroe*, p. 412.

$$\mathrm{D.}\ 6 \left| \frac{1}{9}. \quad \mathrm{A.} \frac{1}{8}. \quad \mathrm{L.\ lat.}\ 45. \right.$$

Præoperculum without spine. The height of the body is contained seven times and a half in the total length, the length of the head five times. Eyes close together, their diameter being two-sevenths of the length of the head. Cleft of the mouth very oblique, with the lower jaw somewhat longer than the upper; the upper maxillary extends nearly to below the anterior margin of the eye. Teeth in villiform bands, those in the outer series rather larger. Caudal pointed; its length is contained three times and three-quarters in the total. Greenish rose-coloured, marbled with brown. (*Bl.*)

Coasts of Anjer (West Java) and of Kajeli (Boeroe).

2. A black spot on the root of the pectoral: *Butis*, Bleek.

16. Eleotris butis.

Cheilodipterus butis, *Buch. Ham.* pp. 57, 367; *Gray & Hardw. Ill. Ind. Zool.* ii. pl. 93. f. 3.
Eleotris humeralis, *Cuv. & Val.* xii. p. 246; *Bleek. Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* pp. 5, 22.
—— butis, *Cant. Catal.* p. 196.
? Eleotris melanopterus, *Bleek. Ceram*, ii. p. 706.

$$\mathrm{D.}\ 6 \left| \frac{1}{8}. \quad \mathrm{A.} \frac{1}{8}. \quad \mathrm{L.\ lat.}\ 28. \quad \mathrm{Vert.}\ 12/14. \right.$$

Præoperculum without spine. Nine series of scales between the origin of the second dorsal fin and the anal. The scales on the upper surface of the head and on the cheeks are minute, extending over a part of the snout. Scales not ciliated. The height of the body is one-fifth of the total length, the length of the head two-sevenths. Snout broad, depressed, produced; the horizontal diameter of the eye is one-sixth or one-seventh of the length of the head, and one-half of the width of the interorbital space. Lower jaw prominent; the maxillary does not extend to the vertical from the centre of the eye. Teeth in villiform bands. Brownish, with lighter longitudinal stripes, and sometimes with scattered brown dots; a deep-black spot on the lower half of the root of the pectoral rays. The second dorsal with blackish spots, and with a more or less broad transparent margin; caudal and anal uniform black, or blackish with darker spots.

East Indies.

a. Adult. China.
b. Adult. Philippine Islands.
c. Fine specimen. Borneo.
d. Half-grown. Amboyna. Purchased of Mr. Frank.
e, f. Adult: skins. Pinang. From Dr. Cantor's Collection.
g. Adult. India. Presented by G. R. Waterhouse, Esq.—Probably the type of the species.
h. Adult. India.
i. Adult: skeleton. From the Collection of the Zoological Society.

The *skull* of this species is distinguished by the extraordinary width of the frontal bones between the orbits. The præoperculum has a double ridge along its whole margin.

17. Eleotris amboinensis.

Bleeker, Amboina, iv. p. 343.

D. $6 \mid \frac{1}{8}$. A. $\frac{1}{8}$. L. lat. 28.

Præoperculum without spine. Forehead scaly. The height of the body is one-seventh of the total length, the length of the head one-fourth. Snout broad, depressed, produced. The diameter of the eye is one-fifth of the length of the head, and equals the width of the interorbital space. The upper and hinder orbital edges are minutely denticulated. The lower jaw is the longest, and the maxillary extends to below the anterior margin of the eye. Teeth in villiform bands, those of the outer series slightly enlarged. The upper pectoral rays silk-like. Brownish, with yellow and brown spots arranged in longitudinal series; a brown band from the snout to the operculum. The spinous dorsal blackish; the soft dorsal yellow, blackish on the base, and with the rays brown-dotted; a large black spot on the base of the pectoral; anal and caudal with red margin and brown-dotted rays. (*Bl.*)

Rivers of Amboyna, Celebes, and Booroo.

18. Eleotris melanostigma.

Bleeker, Verhand. Batav. Genootsch. xxii., *Blenn. en Gob.* p. 23.

D. $6 \mid \frac{1}{7}$. A. $\frac{1}{7}$. L. lat. 30.

Scales on the occiput small. Back elevated. The height of the body is contained five times and three-fourths in the total length, the length of the head three times and a half. Snout broad, depressed, produced; the eyes are distant from each other, and their diameter is one-fifth of the length of the head. Teeth in villiform bands. Brownish, with numerous black dots, those on the cheeks radiating from the eye; anterior dorsal blackish, the other fins variegated with brown; base of the pectoral with black and yellow spots. (*Bl.*)

Java, Madura, Sumatra, and Borneo.

19. Eleotris caperata.

Eleotris caperatus, *Cant. Catal.* p. 197.
—— koilomatodon, *Bleek. Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* p. 21.

D. $6 \mid \frac{1}{8}$. A. $\frac{1}{8}$. L. lat. 30.

The upper edge of the orbit denticulated. Nine longitudinal series of scales between the origin of the second dorsal and the anal. The height of the body is contained four times and two-thirds or five times in the total length, the length of the head four times;

the diameter of the eye is four times and a half in the latter; eyes approximated. Teeth in villiform bands. Brown: fins blackish; a black, red-edged spot on the base of the pectoral fin.

Coasts of Java, Madura, and Celebes; Sea of Pinang; China.

a–b. Adult and half-grown: skins. Sea of Pinang. From Dr. Cantor's Collection.—Types of the species.

c, d. Adult and half-grown. China.

III. Head and body rather compressed, similar in form to a Cyprinoid: *Eleotris* (part.), Bleek.

20. Eleotris cyprinoides.

Cuv. & Val. xii. p. 248; *Bleek. Sumatra*, ii. p. 277.

D. $6 \mid \frac{1}{9}$. A. $\frac{1}{9-10}$. L. lat. 26–28.

Head entirely scaly. Body compressed, its height being nearly equal to the length of the head, and one-fifth of the total; the diameter of the eye is rather more than one-fourth of the length of the head, equal to the width of the interorbital space, and longer than the snout. Snout pointed, with the lower jaw longest; the maxillary does not extend to the vertical from the anterior margin of the eye. Teeth in villiform bands. Scales finely ciliated. Brownish-olive, with a blackish longitudinal band from the upper part of the base of the pectoral, below the lateral line to the caudal; dorsal and caudal fins with brown spots.

Rivers of Bourbon, of Benculen (Sumatra), and of Oualan.

a. Adult. Oualan. Voyage of the 'Herald.'

21. Eleotris leuciscus.

Bleeker, Sumatra, ii. p. 278.

D. $6 \mid \frac{1}{9}$. A. $\frac{1}{11}$. L. lat. 25.

Head entirely scaly. Body compressed, its height being contained three times and three-quarters in the total length, the length of the head four times and a half; the diameter of the eye is two-sevenths of the length of the head, equal to the width of the interorbital space, and longer than the snout. Snout pointed, with the lower jaw longest; the maxillary does not extend to the vertical from the anterior margin of the eye. Teeth in villiform bands. Red anteriorly, green posteriorly; the anterior dorsal fin black, with two yellow bands, the posterior yellow-dotted; pectorals with a double black and yellow spot on the base; the other fins red, black-edged. (*Bl.*)

Rivers of West Sumatra.

22. Eleotris tænionotopterus.

Bleeker, Bali, p. 298.

B. 6. D. $6 \mid \frac{1}{9}$. A. $\frac{1}{10}$. L. lat. 28.

Head and body compressed, entirely (?) scaly. The height of the body is nearly equal to the length of the head, and one-fourth of the total. The diameter of the eye is contained three times and two-thirds in the total length, and rather more than the width of the interorbital space and than the length of the snout. The upper jaw is shorter than the lower, and the maxillary does not extend to the vertical from the anterior margin of the eye. Teeth in villiform bands, those of the outer series being enlarged. Greenish; a broad brown band from the eye to the throat: dorsal fins black; the anterior with two white spots, one above the other, the posterior with three white bands, ascending obliquely forwards: anal rose-coloured, brownish inferiorly. (*Bl.*)

Rivers of Bali.

23. Eleotris cyanostigma.

Eleotris cyanostigma, *Bleeker, Kokos,* iv. p. 452.
Eleotriodes cyanostigma, *Bleek. Enum. Spec.* p. 112.

D. $6 \mid \frac{1}{11}$. A. $\frac{1}{10}$. L. lat. 25.

The third dorsal spine is produced into a filament. Head covered with large scales, snout naked; body compressed. The height of the body is nearly equal to the length of the head, and one-fifth of the total; the eyes are close together, one-third of the length of the head, and longer than the snout. The jaws are equal; the maxillary extends to below the middle of the eye. Teeth in villiform bands, those of the outer series being enlarged; a small canine tooth on each side of the lower jaw. Scales ctenoid. Greenish, with a longitudinal series of five or six brown spots; each scale with a blue dot. Vertical fins brownish-violet; the second dorsal, anal, and caudal with some blue spots. (*Bl.*)

Sea of Booroo and Kokos Island.

B. Scales small, fifty and more in a longitudinal series.
- I. Less than twenty rays in the soft dorsal and anal fins.
  - 1. None of the rays produced into a filament.
    - *a.* No ocellated spot on the base of the caudal.
      - *a.* None of the bones of the head armed.
        - *aa.* Vomerine teeth: *Philypnus,* Val.

24. Eleotris dormitatrix.

Platycephalus dormitator, *Bl. Schn.* p. 60. tab. 12.
Gobiomorus dormitator, *Lacép.* ii. p. 599.
Eleotris dormitatrix, *Cuv. Règne Anim.*
Philypnus dormitator, *Cuv. & Val.* xii. p. 255. pl. 358; *Girard, U. S. & Mex. Bound. Survey, Ichthyol.* p. 29. pl. 12. fig. 13 (young).

B. 6. D. $6 \mid \frac{1}{9}$. A. $\frac{1}{9}$. L. lat. 60–65. Vert. 12/14.

Vomerine teeth in a crescent-shaped band. Thirty-two series of scales between the occiput and the anterior dorsal fin, twenty or twenty-two between the origin of the posterior dorsal and the anal.

The height of the body is contained six times and two-thirds to eight times in the total length, the length of the head three times and three-quarters or three times and two-thirds. Snout produced, depressed, with the lower jaw prominent; the maxillary extends to below the middle of the eye; teeth cardiform. The vertical diameter of the eye is one-half the width of the interorbital space. Body brownish, marbled with darker; head with two brown stripes between the eye and the upper jaw; two indistinct oblong spots on the base of the pectoral. Fins rose-coloured, with series of brown spots.

Fresh waters of the West Indian Islands and of Mexico.

a. Adult: has been in chloride of zinc. Barbadoes. Purchased of Mr. Cuming.
b–d. Adult: skins. Jamaica. From Dr. Parnell's Collection.
e. Adult: skin. West Indies. From Mr. Scrivener's Collection.
f, g, h, i. Adult and half-grown. West Indies.
k. Adult: stuffed. West Indies. Purchased of Mr. Warwick.
l–p. Fine specimens. Mexico. From M. Sallé's Collection.—Rather more slender than the specimens from the Islands.
q. Large specimen. From the Collection of the Zoological Society.
r. Seventeen inches long. From the Haslar Collection.
s, t. Adult and half-grown: bad state. From Captain Sir E. Belcher's Collection.
u–w. Half-grown: stuffed.
x. Adult: skeleton. From the Haslar Collection.

Skeleton.—The crown of the head is flat, broader than long; the occipital crest is low, and does not extend beyond the occipital bone; another crest on each side of the occipital, and parallel to it, is higher, and extends from the suprascapula to another crest which runs transversely from the posterior angle of one orbit across the frontals to the angle of the other. The oblong space between the two lateral and the transverse crests is twice as long as broad. The transverse frontal crest is continuous from one side of the head to the other, and participates in the formation of a muciferous channel running along the posterior margin of the orbit. The interorbital space is broad. The anterior portion of the ethmoid is not covered by the frontal bones. The præfrontal is well developed, and forms a laterally projecting portion of the orbit. The maxillary bone is curved, sabre-shaped, and very slightly dilated at its extremity. The intermaxillary is stout, with the posterior processes short. The articular bone and the posterior part of the dentary of the mandible have a broad and thin lamella interiorly. The vomer is anchor-shaped. The palatine bone, and still more the pterygoid, are narrow. Tympanic groove with a very large free space behind the tympanic bone. The infraorbital ring is indicated by a small præorbital and a rudimentary postorbital. The præoperculum has a double ridge posteriorly for a muciferous channel, its lower margin being simple; interoperculum small, operculum and suboperculum of moderate size. Glossohyal triangular; urohyal elongate, subtriangular.

The humeral arch is partially lost in our skeleton. Valenciennes says that it is similar in its structure to that in the Gobies, and that neither radius nor ulna is notched. The carpal bones are in two series, united, however, in very large specimens. The pubic bones are flat and separated.

There are twelve abdominal and fourteen caudal *vertebræ*, the former portion of the vertebral column being somewhat shorter than the caudal. Ribs and processes rather feeble, much inclining backwards.

	lines.
Length of the first vertebra	3
——— of the fifth vertebra	$3\frac{1}{2}$
——— of the twelfth vertebra	$3\frac{1}{2}$
——— of the sixteenth vertebra	$3\frac{1}{2}$
——— of the twenty-third vertebra	3
——— of the abdominal portion	43
——— of the caudal portion	45

25. Eleotris lembus.

Lembus maculatus, *Gthr. Acanthopt.* i. p. 505, and *Proc. Zool. Soc.* 1860, p. 236.

B. 6. D. $6 \mid \frac{1}{9}$. A. $\frac{1}{10}$. L. lat. 57–60. Vert. 12/14.

Vomerine teeth in a crescent-shaped band. Twenty-six series of scales between the occiput and the anterior dorsal fin, eighteen between the origin of the posterior dorsal and the anal, twenty-two below the first dorsal spine. The height of the body is contained five or six times in the total length, the length of the head three times and a half. Snout produced, depressed, with the lower jaw prominent; the maxillary extends nearly to below the middle of the eye; teeth cardiform posteriorly. The vertical diameter of the eye is one-half the width of the interorbital space. Yellowish, irregularly spotted with brown; back with five dark cross-bars, appearing in specimens preserved in spirits. A red spot and, above it, a black one on the upper portion of the root of the pectoral; three red streaks radiating from the eye; the vertical fins dotted with red and yellow (the red colours change into blackish after death).

Fresh waters of Ecuador. Esmeraldas.

a. Not good state. Western Ecuador. From Mr. Fraser's Collection.—Type of the species.

b, c. Fine specimens. Western Ecuador. From Mr. Fraser's Collection.

d. Skeleton. Western Ecuador. From Mr. Fraser's Collection.

This species is certainly different from *E. dormitatrix*, having a stouter habit, larger scales on the nape, &c.; but the genus *Lembus* is perfectly identical with *Philypnus* of Valenciennes. The number seven for the dorsal spines was given erroneously in my former description, drawn up from a specimen in an incomplete state of preservation. The specific name must be altered, if *Lembus maculatus* and *Sciæna maculata*, Bl., are referred to the same genus.

The *skeleton* of this species is extremely similar to that of the preceding: the transverse frontal crests, however, are not continuous, or forming a straight line; both have an oblique direction, and are convergent anteriorly towards the interorbital space; they do not meet.

26. Eleotris lateralis.

Philypnus lateralis, *Gill, Proc. Acad. Nat. Sc. Philad.* 1860, p. 123.

D. $6 \mid \frac{1}{9}$. A. $\frac{1}{10}$. L. lat. 55.

The height of the body is contained five times in the total length, the length of the head three times and a third; the eyes are at the third sixth of the length of the head. The maxillary extends to the vertical from the eye. Purplish-brown, with a black band along the side, dividing about nine light vertical bands; it is somewhat dilated at the base of the caudal fin. Head with a dark vertical band from the eye to the angle of the mouth, another from the inferior corner of the orbit to the extremity of the operculum, and a third horizontal one from the eye to the upper jaw. Pectoral with a black spot superiorly at the axil, and with a blackish basal band edged with whitish. Vertical fins spotted with white and black, sometimes immaculate. (*Gill.*)

Cape St. Lucas (Lower California).

The chief difference between this and the preceding species appears to be the black lateral band; otherwise they are very closely allied to each other, and a comparison of actual specimens may show their specific identity.

bb. Palate entirely smooth: *Eleotris* (part.), Bleek.

27. Eleotris gyrinus.

? Eleotris, sp., *Gronov. Mus. Ichthyol.* ii. p. 16. no. 168.
? Gobius pisonis, *L. Gm.* i. p. 1206.
? Gobius amorea, *Artedi, Walb.* iii. p. 205.
? Eleotris pisonis, *Bl. Schn.* p. 68.
Eleotris gyrinus, *Cuv. & Val.* xii. p. 220. pl. 356; *Cuv. Règne Anim. Ill. Poiss.* pl. 81. fig. 2.

D. $6 \mid \frac{1}{8}$. A. $\frac{1}{8}$. L. lat. 60. Vert. 11/15.

Scales rather small, those on the side of the head minute. The height of the body is contained five times in the total length, the length of the head three times and two-thirds. The eye is rather small, one-half of the width of the interorbital space. Snout of moderate length, with the lower jaw prominent; the maxillary reaches to beyond the vertical from the centre of the eye. Teeth villiform, in bands. Brown: vertical fins with brown dots; temple with two darker stripes.

Fresh waters of Martinique, San Domingo, Mexico, and Surinam.

a–b. Adult and half-grown. From the Collection of the Zoological Society.

28. Eleotris smaragdus.

Cuv. & Val. xii. p. 231; *Guichen. Poiss. in Ramon de la Sagra, Hist. Cuba*, p. 130.

$$\mathrm{D.}\ 6 \,\Big|\, \frac{1}{10}. \quad \mathrm{A.}\ \frac{1}{9}.$$

Scales very small. The height of the body is one-half the length of the head, which is one-fifth of the total. The eye occupies the second sixth of the length of the head, and its diameter is two-thirds of the width of the interorbital space. Snout obtuse, with the lower jaw prominent; cleft of the mouth oblique, not extending to the vertical from the anterior margin of the eye. Teeth villiform. Caudal pointed, one-fourth of the total length. Brown: dorsal fins brown-spotted. (*Val.*)

Fresh waters of Cuba.

29. Eleotris fornasini.

Bianconi, Spec. Zool. Moss. p. 270. tab. 8.

$$\mathrm{D.}\ 6 \,\Big|\, \frac{1}{8}. \quad \mathrm{A.}\ \frac{1}{7}. \quad \mathrm{L.\ lat.}\ 58.$$

Præoperculum without spine. Posterior parts of the head covered with very small scales. The height of the body equals the length of the pectoral fin, and is contained five times in the total length, the length of the head three times and three-fourths, the length of the caudal fin nearly five times. The width of the interorbital space is twice the diameter of the eye. Teeth in villiform bands. The second dorsal is higher than the first. Greyish-brown. (*Bianc.*)

Mozambique.

30. Eleotris gyrinoides.

Bleeker, Sumatra, ii. p. 272.

$$\mathrm{D.}\ 6 \,\Big|\, \frac{1}{8}. \quad \mathrm{A.}\ \frac{1}{8}. \quad \mathrm{L.\ lat.}\ 62.$$

Præoperculum without spine. Head covered with very small scales. The height of the body is contained six times or five times and three-quarters in the total length, the length of the head four times. The diameter of the eye is one-fifth of the latter, and equal to the width of the interorbital space. The upper jaw is shorter than the lower, and the maxillary reaches to below the posterior half of the eye. Teeth in villiform bands. The length of the caudal fin is contained five times and two-thirds in the total. Dark greenish, with darker stripes along the series of scales; fins yellow, variegated with brown; an irregular black, red-edged spot on the base of the pectoral fin. (*Bl.*)

Rivers of Priaman and Celebes.

31. Eleotris marmorata.

Bleeker, Borneo, vi. p. 424.

$$\mathrm{D.}\ 6 \,\Big|\, \frac{1}{9}. \quad \mathrm{A.}\ \frac{1}{8}. \quad \mathrm{L.\ lat.}\ 70\text{–}75.$$

Præoperculum without spine. Twenty-two series of scales between the origin of the posterior dorsal fin and the anal. The scales on the head are minute, leaving the snout and the lower part of the cheek naked. Scales ciliated. The height of the body is contained five times and two-thirds in the total length, the length of the head three times and a half. The eye occupies the third eighth of the length of the head, and its horizontal diameter is one-half the width of the interorbital space. Snout depressed, flat, of moderate length, with the lower jaw prominent. Teeth in villiform bands. The maxillary extends to below the middle of the eye. Yellowish, largely marbled with brown; brown stripes along the series of scales. Caudal brown, with lighter spots.

Rivers of Siam, Bandjermassing (Borneo), and of Palembang (Sumatra).

a. Fine specimen: three and a half inches long. Siam. From M. Mouhot's Collection.

32. Eleotris guavina.

Guavina, *Parra*, pl. 39. fig. 1.
Eleotris guavina, *Cuv. & Val.* xii. p. 223.

$$\mathrm{D.}\ 7 \,\Big|\, \frac{1}{10}. \quad \mathrm{A.}\ \frac{1}{10}. \quad \mathrm{L.\ lat.}\ 110.$$

Thirty series of scales between the origins of the second dorsal and the anal fins. The scales on the upper surface of the head are small, and advance nearly to the extremity of the snout, those on the sides to below the middle of the orbit. Scales cycloid. The height of the body is one-sixth of the total length, the length of the head one-fourth. The eye occupies the third eighth of the length of the head, and its diameter is one-third of the width of the interorbital space. The maxillary extends to the vertical from the centre of the eye; teeth villiform, in broad bands. The second dorsal fin reaches to the caudal, if laid backwards. Blackish-brown; fins black.

Fresh waters of Cuba, Martinique, Surinam, and Demerara.

a. Adult. South America. Purchased of Mr. Brandt.
b. Adult. Demerara. Presented by Dr. Hancock.

33. Eleotris canina.

Bleek. Verhand. Batav. Genootsch. xxii., *Blenn. en Gob.* p. 20.

$$\mathrm{B.}\ 6. \quad \mathrm{D.}\ 6 \,\Big|\, \frac{1}{9}. \quad \mathrm{A.}\ \frac{1}{8}. \quad \mathrm{L.\ lat.}\ 70\text{–}80.$$

Two canine teeth in the upper jaw, and four in the lower. The height of the body is one-sixth of the total length, the length of the head one-fourth. The eyes occupy the second fifth of the length of the head, and are distant from each other. Green. (*Bl.*)

Western coast of Madura; Java.

34. Eleotris periophthalmus.

Eleotris periophthalmus, *Bleeker, Batavia*, p. 477.
Eleotriodes periophthalmus, *Bleeker, Goram*, p. 212.

$$\mathrm{D.}\ 6 \,\Big|\, \frac{1}{12}. \quad \mathrm{A.}\ \frac{1}{12}. \quad \mathrm{L.\ lat.}\ 78.$$

Head naked. The height of the body is one-eighth of the total length, the length of the head one-fifth; head obtuse, with the anterior profile very convex; eyes close together, much longer than the snout. Jaws nearly equal anteriorly; the maxillary extends to the vertical from the posterior margin of the eye. The teeth form bands, those of the outer series being enlarged; a canine tooth on each side of the lower jaw. Yellowish, with six broad cross-bars; head with red, purplish-edged ocelli; rays of the dorsal fins brown-dotted; anal with three blue longitudinal bands. (*Bl.*)

Sea of Batavia.

β. A spine at the angle of the præoperculum: *Culius*, Bleek.

35. Eleotris fusca.

Pœcilia fusca, *Bl. Schn.* p. 453.
Cobitis pacifica, *Forst. Descript. Anim. ed. Licht.* p. 235.
Cheilodipterus culius, *Buch. Ham. Fish. Ganges*, p. 55. pl. 5. fig. 16.
Eleotris nigra, *Quoy & Gaim. Voy. Freyc. Zool.* p. 259. pl. 60. fig. 2; *Cuv. & Val.* xii. p. 233; *Bleek. Verhand. Batav. Genootsch.* xxv., *Nalez. Ichth. Beng.* p. 105. tab. 1. fig. 3.
—— mauritianus, *Benn. Proc. Comm. Zool. Soc.* i. p. 166.
Culius niger, *Bleek. Boeroe*, p. 411.

D. $6 \mid \frac{1}{8}$. A. $\frac{1}{8}$. L. lat. 60–65. Vert. 11/14.

Præoperculum with a spine directed downwards. Sixteen series of scales between the origins of the second dorsal and the anal fins. The scales on the upper surface of the head are small, and advance to the space between the eyes; those on the cheeks are minute. Scales ciliated. The height of the body is one-fifth of the total length, the length of the head one-fourth. The eye occupies the third seventh of the length of the head, and its vertical diameter is one-third of the width of the interorbital space. Snout depressed, short, with the lower jaw prominent; the maxillary extends beyond the vertical from the centre of the eye. Teeth villiform, forming bands; those of the outer series enlarged, of rather unequal size. Blackish-brown: the lateral scales sometimes with black centre, the spots forming either more or less regular longitudinal series, or a band along the middle of the side; dorsal and caudal fins with distinct, anal and pectoral fins with rather indistinct series of brown dots.

From Madagascar and Mauritius to Polynesia.

a, b. Half-grown. Ganges. Presented by G. R. Waterhouse, Esq.
c. Half-grown. Calcutta. From the Collection of Messrs. von Schlagintweit.
d. Half-grown. Bay of Bengal. From the Collection of the Zoological Society.
e, f–g. Adult and young. Amboyna. Purchased of Mr. Frank.
h, i. Fine specimens. Aneiteum (fresh water). From Mr. Macgillivray's Collection.
k–m, n. Adult and young. Oualan (fresh water). Voyage of the 'Herald.'

o. Adult. Wanderer Bay (fresh water). From the Museum of Economic Geology.
p, *q*, *r*. Half-grown. Ceylon.
s, *t–u*. Adult. From the Collection of the Zoological Society.—? Types of *E. mauritianus*, Benn.
v, *w–x*. Half-grown: not good state. From the Haslar Collection.
y. Adult: stuffed.
z. Adult: skeleton. Aneiteum (fresh water). From Mr. Macgillivray's Collection.

Eleotris pseudacanthopomus, Bleek. Sumatra, ii. p. 276, is probably identical with this species. Bleeker compares it with the following species (*E. melanosoma*), and adds that it may be distinguished by the operculum, which is entirely scaly, and by a small canine tooth in the lower jaw. *Eleotris brachyurus* (Bleek. Verhand. Batav. Genootsch. xxii., Blenn. en Gob. p. 20) has been referred to *E. pseudacanthopomus* by Bleeker himself. See Enumer. Spec. p. 114.

Air-bladder large.

Skeleton.—The crown of the head is entirely smooth, only a trace of an occipital crest being visible; it is broad and somewhat convex along the middle; the interorbital space is of moderate width. The intermaxillary is considerably shorter than the maxillary, and dilated at its extremity; its posterior processes are of moderate length. The articulary and the posterior part of the dentary bone of the mandible have a broad horizontal lamella interiorly. The margins of the præoperculum are simple; there is a spine at the angle. The pubic bones leave a free space between them, and are elongate, triangular; they do not extend to the humerus, to which they are joined by a broad, flat cartilaginous lamella. Eleven abdominal and fourteen caudal vertebræ.

36. **Eleotris melanosoma.**

Eleotris melanosoma, *Bleek. Ceram*, ii. p. 705.
Culius melanosoma, *Bleek. Boeroe*, p. 412.
? Culius macrocephalus, *Bleek. Boeroe*, ii. p. 70.

$$\text{D. } 6 \,\Big|\, \tfrac{1}{8}. \quad \text{A. } \tfrac{1}{8}. \quad \text{L. lat. } 52.$$

Præoperculum with a spine directed downwards. The scales on the upper surface of the head are small, extending over the forehead; cheeks naked. The height of the body is one-sixth or one-seventh of the total length, the length of the head one-fourth. The diameter of the eye is contained four times and a half or five times and a half in the length of the head, and three-fifths of the width of the interorbital space. The upper jaw is shorter than the lower, and extends backwards to below the middle of the eye. Teeth villiform, forming bands. Blackish-green; fins variegated with black. (*Bl.*)

Coasts of Wahai (West Sumatra), Booroo, and Ceram.

a. Adult. Presented by C. Swanzz, Esq.

γ. Some of the branchiostegals terminating in a spine anteriorly: *Belobranchus*, Bleek.

37. Eleotris belobrancha.

Eleotris belobrancha, *Cuv. & Val.* xii. p. 243; *Bleek. Celebes*, iv. p. 167.
Belobranchus quoyi, *Bleek. Bali*, p. 300.

B. 6. D. 6 | $\frac{1}{7}$. A. $\frac{1}{7}$. L. lat. 70. Vert. 10/15.

Præoperculum without spine; two spines behind the angle of the lower jaw, belonging to the first and second branchiostegals. Head naked. Scales minutely ciliated. The height of the body is one-seventh of the total length, the length of the head one-fourth. The diameter of the eye is one-seventh or one-sixth of the length of the head, and two-thirds of, or equal to, the width of the interorbital space. Snout very obtuse, with the jaws nearly equal; the maxillary extends to beyond the vertical from the posterior margin of the orbit. Teeth villiform, those of the outer series rather stronger. The upper pectoral rays silk-like. Brownish, with darker stripes along the series of scales; fins red, with brown dots on the rays; pectoral with a large brown spot on the base.

Fresh waters of Celebes, Batjan, and Ceram.

a. Adult. Ceram. From the Collection of Madame Ida Pfeiffer.

38. Eleotris tænioptera.

Belobranchus tæniopterus, *Bleek. Bali*, p. 301.

B. 6. D. 6 | $\frac{1}{7}$. A. $\frac{1}{7}$. L. lat. 65.

Præoperculum without spine; the first branchiostegal anteriorly ending in a spine. Head naked; scales ctenoid. The height of the body is contained six times and a half or seven times in the total length, the length of the head four times and two-fifths or four times and three-fourths. The diameter of the eye is two-sevenths of the length of the head, and much more than the width of the interorbital space. Snout obtuse, much shorter than the eye, with the jaws nearly equal; the maxillary extends to below the middle of the eye. Teeth villiform, those of the outer series rather stronger. The upper pectoral rays silk-like. Brownish, with lighter cross-bands; three or four brown streaks run from the eye towards the opercles; fins yellow: the spinous dorsal with two curved blackish bands, parallel to the upper margin; the soft dorsal with four or five, the anal with three or four brown longitudinal bands; caudal and pectoral with brown cross-bars. (*Bl.*)

Rivers of Bali and Batjan.

b. An ocellated spot on the base of the caudal fin.

α. Vomerine teeth: *Bostrichthys*, Gill.

39. Eleotris sinensis.

Bostrychus sinensis, *Lacép.* iii. p. 141. pl. 14. fig. 2.
Gobius sinensis, *Cuv. & Val.* xii. p. 94.

Philypnus ocellicauda, *Richards. Voy. Sulph. Fishes*, pp. 58, 149. pl. 56. figs. 15, 16.
—— sinensis, *Richards. Ichth. Chin.* p. 210.
—— ophicephalus, *Bleek. in Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* p. 20.
Bostrichthys sinensis, *Gill, Proc. Acad. Nat. Sc. Philad.* 1860, p. 125.

$$\text{D. } 6 \,\Big|\, \frac{1}{10\text{–}12}. \quad \text{A. } \frac{1}{9}. \quad \text{L. lat. } 140. \quad \text{Vert. } 12/15.$$

Scales on the head and neck rudimentary. A broad patch of teeth on the vomer, forming one-half of an oval. The height of the body is contained six times and a half in the total length, the length of the head four times and a third. Head broad, depressed, obtuse; eye small; cleft of the mouth wide, extending behind the vertical from the posterior margin of the eye. The anterior nostril produced into a short barbel-like tube. Brown, marbled with darker; a round black, white-edged ocellus on the upper part of the root of the caudal.

China. Coasts of Java and Bintang. Fresh waters of Oualan.

a. Nine inches long. China. Presented by J. R. Reeves, Esq.
b. Half-grown. China.
c. Half-grown: bad state. Hongkong. From the Haslar Collection.
d. Adult. Fresh waters of Oualan. Voyage of the 'Herald.'
e. Half-grown. Presented by Sir A. Smith.
f. Half-grown: skeleton. China. Presented by J. R. Reeves, Esq.

Air-bladder large. Pseudobranchiæ, a slit behind the fourth gill. Intestinal tract short, making a single circumvolution.

The vertebral column is composed of twelve abdominal and fifteen caudal vertebræ, both portions being equal in length.

β. Palate entirely smooth: *Eleotris* (part.), Bleek.

40. Eleotris urophthalmus.

Bleeker, Borneo, iv. p. 202.

$$\text{D. } 7 \,\Big|\, \frac{1}{9}. \quad \text{A. } \frac{1}{9}. \quad \text{L. lat. } 75.$$

The height of the body is one-eighth or one-seventh of the total length, the length of the head one-fourth. Head broad, depressed, obtuse. The diameter of the eye is one-sixth of the length of the head, or one-half of the width of the interorbital space. The cleft of the mouth extends to below the orbit; teeth in villiform bands. The length of the caudal fin is one-fifth of the total. Brownish; a black, red-edged ocellus on the upper part of the base of the caudal fin. (*Bl.*)

Rivers of Bandjermassing.

41. Eleotris urophthalmoides.

Bleeker, Sumatra, ii. p. 273.

$$\text{D. } 6 \,\Big|\, \frac{1}{9}. \quad \text{A. } \frac{1}{8}. \quad \text{L. lat. } 60.$$

Scales on the head and neck very small. The height of the body is contained six times and a quarter or seven times in the total length, the length of the head three times and two-thirds or four times and a quarter. Head broad, depressed. The diameter of the eye is one-sixth or one-seventh of the total length, and one-half of the width of the interorbital space. The maxillary reaches to below the eye. Teeth in villiform bands, those of the outer series enlarged. The length of the caudal fin is one-fifth of the total. Brownish, with darker longitudinal streaks; a black, red-edged ocellus on the upper part of the base of the caudal. (*Bl.*)

Rivers of Western Borneo and Sumatra.

42. Eleotris siamensis.

D. 6 | 10. A. 9. L. lat. 90.

Twenty-two longitudinal series of scales between the origin of the posterior dorsal and the anal, forty transverse ones between the anterior dorsal and the snout. The height of the body is contained six times and two-thirds in the total length, the length of the head four times. Head broad, depressed, with the snout obtuse; the lower jaw is prominent, and the maxillary extends to behind the vertical from the centre of the eye. Teeth in villiform bands. The diameter of the eye is one-seventh of the length of the head, one-half of that of the snout and of the width of the interorbital space. A small barbel on each side of the upper jaw; the head is covered with small scales; there are about ten between the posterior angle of the orbits; the snout is naked. Dorsal and anal fins much lower than the body: one-half of the caudal is covered with thin scales; its length is contained five times and a half in the total. Brown; the lower parts whitish, minutely punctulated with brown; two oblique dark stripes on the cheek, radiating from the eye. Dorsal fins variegated with blackish, the other fins uniform blackish; a black ocellus, edged with whitish, on the upper part of the root of the caudal fin.

Siam.

a–c. Adult and half-grown. Siam. From M. Mouhot's Collection.

	lines.
Total length	60
Height of the body	9
Length of the head	15
Diameter of the eye	2
Length of the caudal fin	11

43. Eleotris macrodon.

Bleek. Verh. Batav. Genootsch. xxv., *Beng. en Hind.* p. 104. tab. 2. fig. 1.

D. 6 | 10–11. A. 9. L. lat. 90–100.

Thirty-three longitudinal series of scales between the origin of the posterior dorsal and the anal, sixty transverse ones between the anterior dorsal and the snout. The height of the body is contained four times and two-thirds or five times in the total length, the length of the head four times and a fourth. Head broad, depressed, with the snout obtuse; the lower jaw is somewhat prominent, and the maxillary extends to below the middle of the eye. Teeth of the outer series enlarged. The diameter of the eye is one-ninth of the length of the head, one-half of that of the snout, and one-third of the width of the interorbital space. A small barbel on each side of the upper jaw. The head is covered with minute scales, the snout is naked. Dorsal and anal fins much lower than the body: the greater portion of the caudal is scaly; its length is about one-seventh of the total. Brownish-olive (in spirits); dorsal and caudal fins dotted with brown, the other fins uniform. A blackish (in life reddish-brown) ocellus, edged with whitish, on the upper part of the base of the caudal.

Rivers near Calcutta.

a, b–c. Adult. India. Presented by G. R. Waterhouse, Esq.

	lines.
Total length	60
Height of the body	13
Length of the head	14
Diameter of the eye	1½
Length of the caudal fin	9

2. Some of the dorsal spines produced into filaments: *Valenciennea,* Bleek., or *Eleotriodes* (part.), Bleek.

44. Eleotris muralis.

Eleotris muralis, (*Quoy & Gaim.*) *Cuv. & Val.* xii. p. 253. pl. 357; *Bleek. Amboina & Ceram,* p. 276.
Valenciennea muralis, *Bleek. Boeroe,* p. 412.
Eleotriodes muralis, *Bleek, Goram,* p. 212.

B. 5. D. 6 | $\frac{1}{12}$. A. $\frac{1}{12}$. L. lat. 80.

The second, third, and fourth dorsal spines produced into filaments. The height of the body is one-eighth or one-ninth of the total length; the width of the interorbital space is one-half of the diameter of the eye. Teeth in single series, of unequal size. Brownish: head and body with red longitudinal bands; back with some irregular dark cross-bars. Fins yellow: the first dorsal with a black spot behind the top of the third spine; dorsal and anal fins with red longitudinal bands; caudal with red and brown spots.

East Indian Archipelago. Philippine Islands.

a. Adult. Philippine Islands.
b. Half-grown: not good state. From the Haslar Collection.

45. Eleotris sexguttata.

Eleotris sexguttata, *Cuv. & Val.* xii. p. 254; *Bleek. Blenn. en Gob.* p. 253, and *Act. Soc. Sc. Indo-Nederl.* iii., *Sumatra,* p. 42.
Valenciennea sexguttata, *Bleek. Boeroe,* p. 412.
Eleotriodes sexguttata, *Bleek. Goram,* p. 212.

B. 4–5. D. 6 | $\frac{1}{12}$. A. $\frac{1}{12}$. L. lat. 75–80.

The second, third, and fourth dorsal spines are produced into filaments. The height of the body is one-seventh or one-eighth of the total length; the width of the interorbital space is much less than that of the orbit. Jaws equal anteriorly; teeth in single series, of unequal size. Greenish rose-coloured: sides of the head with blue, darker-edged ocelli; sometimes a violet spot before the anterior dorsal fin. The anterior dorsal black at the top, the posterior with six violet longitudinal stripes, the anal with two; caudal with pearl-coloured, violet-edged ocelli.

Coasts of Ceylon. East Indian Archipelago.

46. Eleotris strigata.

Eleotris strigata, *Cuv. & Val.* xii. p. 251; *Bleek. Act. Soc. Sc. Indo-Nederl.* i., *Amboina*, p. 48.
Valenciennea strigata, *Bleek. Boeroe*, p. 412.
Eleotriodes strigata, *Bleek. Goram*, p. 212.

B. 5. D. $6 \mid \frac{1}{18}$. A. $\frac{1}{16\text{–}17}$.

Scales very small. The second and third dorsal spines produced into filaments. The height of the body is contained six times in the total length, the length of the head four times and a half or four times and three-fifths; the width of the interorbital space is less than that of the orbit. Jaws equal anteriorly; teeth in single series, of unequal size. Greenish rose-coloured, with four or five red longitudinal bands; a pearl-coloured, black-edged band from the angle of the mouth to the extremity of the operculum; an oblique similar band on the præoperculum, and another on the suboperculum. The anterior dorsal fin with one, the posterior with three red longitudinal bands.

Coasts of Java, Amboyna, Celebes, Booroo, and Otaheite.

a. Amboyna. Purchased of Mr. Frank.

3. Some of the caudal rays produced into filaments:
Eleotriodes (part.), Bleek.

47. Eleotris helsdingenii.

Eleotriodes helsdingenii, *Bleek. Goram*, p. 212.

D. $6 \mid \frac{1}{11}$. A. $\frac{1}{11}$. L. lat. 130.

The two caudal rays, which are nearest to the three middle ones, are produced into long filaments. Head naked. The height of the body is one-seventh of the total length (without caudal filaments). The width of the interorbital space is less, the length of the snout more, than the diameter of the eye. The maxillary extends to below the middle of the orbit. Teeth in the upper jaw in a single series, of unequal size. The anterior dorsal fin is lower than the body. Greenish rose-coloured, with two brown bands from the snout to the caudal filaments. (*Bl.*)

Sea of Goram.

II. More than twenty rays in the soft dorsal and anal fins: *Eleotriodes* (part.), Bleek.

48. Eleotris heteroptera.

Eleotris heteropterus, *Bleek. Borneo,* ix. p. 422.
Eleotriodes heteropterus, *Bleek. Goram,* p. 212.

B. 4. D. 6 | $\frac{1}{30}$. A. $\frac{1}{29}$.

Scales scarcely conspicuous. The height of the body is contained eight times and a half in the total length, the length of the head five times and a quarter. Cleft of the mouth very oblique, with the upper jaw shortest; the maxillary extends to below the anterior half of the eye. Dorsal fins lower than the body; caudal forked. Greenish rose-coloured; a black spot along the middle of the caudal. (*Bl.*)

Rivers of Bandjermassing.

49. Eleotris microlepis.

Eleotris microlepis, *Bleek. Banda,* v. p. 102.
Eleotriodes microlepis, *Bleek. Goram,* p. 212.

B. 4. D. 6 | $\frac{1}{27}$. A. $\frac{1}{27}$.

Scales scarcely visible. The height of the body is one-eighth of the total length, the length of the head one-sixth. Cleft of the mouth very oblique, with the upper jaw shorter; the maxillary extends to below the anterior half of the eye. Dorsal fins lower than the body. Caudal slightly emarginate. Greenish rose-coloured: sides of the head with blue spots; a curved blue streak behind the eye, another on the opercle; caudal immaculate. (*Bl.*)

Coasts of Banda and Nias.

15. ASTERROPTERYX.

Asterropteryx, *Rüpp. Atl. Fische,* p. 138.

Head and body compressed, covered with large scales; eyes of moderate size, lateral, not prominent. Teeth in a single series. Two dorsal fins, the anterior with six flexible spines. Ventrals not united, with the space between them narrow, and with one spine and five rays. Gill-openings of moderate width, not contiguous. Branchiostegals three (?); air-bladder none. Anal appendage absent.

Red Sea.

1. Asterropteryx semipunctatus.

Rüpp. l. c. taf. 34. fig. 4.

D. 6 | 12. A. $\frac{1}{9}$.

The middle spines of the anterior dorsal fin and the ventral elongate. Yellowish-brown, each scale with a blue spot. (*Rüpp.*)

Massaua.

Second Group. AMBLYOPINA.

The two dorsal fins united into one. Vertebræ 11/17.

16. AMBLYOPUS*.

Gobioides, *Lacép.* ii. p. 280; *Cuv. & Val.* xii. p. 139.
Amblyopus, *Cuv. & Val.* xii. p. 157.

Body elongate, naked, or with minute rudimentary scales; head oblong, quadrilateral, with the cleft of the mouth directed upwards, and with the lower jaw prominent. Gill-openings of moderate width. Eyes very small, more or less hidden. Teeth in a band, the anterior ones being very strong. One long dorsal fin, the five anterior rays being simple, and separated from the soft portion by an interspace; a sixth simple ray between the anterior ones and the soft portion; dorsal and anal more or less continuous with the caudal. Ventral fins united. Branchiostegals four. Air-bladder absent, or very small; gills four; pseudobranchiæ none.

A tropical genus, confined to the coasts, estuaries, and fresh waters of the East Indies, extending northwards to China and Japan; one species from the west coast of South America.

1. Amblyopus cæculus.

? Gobius anguillaris, *L. Syst.* i. p. 450; *Bl. Schn.* p. 71.
? Cepola cœcula, *Bl. Schn.* p. 241. tab. 54.
Amblyopus cœculus, *Cuv. & Val.* xii. p. 165.
—— hermannianus, *Cantor, Catal.* p. 190 (not *Cuv. & Val.*).

D. $\frac{6}{43-44}$. A. 45.

The length of the head is one-eighth of the total, or four-sevenths of the distance between the root of the ventral and the vent. Pectoral short; dorsal and anal fins scarcely united with the caudal, and enveloped in a thick skin. The lower jaw with small barbels. Body naked.

Estuaries and fresh waters of Bengal and China.

a. Adult: skin. Sea of Pinang. From Dr. Cantor's Collection.—Type of Dr. Cantor's description.
b. Half-grown. Madras. Presented by T. C. Jerdon, Esq.
c, d–f. Adult and half-grown. China.
g. Adult. Canton. From the Collection of the Zoological Society.
h, i. Adult and half-grown. From the Haslar Collection.

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* 1. Amblyopus roseus, *Cuv. & Val.* xii. p. 164.—Bombay.
2. —— eruptionis, *Bleek. Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* p. 38.—East Java; Amboyna.
3. —— lacepedii, *Schleg. Faun. Japon. Poiss.* p. 146. pl. 75. fig. 2.—Japan.
4. —— rugosus, *Richards. Ichth. China*, p. 207.—China. Typical specimens in the Cambridge Museum.

2. Amblyopus gracilis.

Amblyopus gracilis, *Cuv. & Val.* xii. p. 166.
—— gracilis, *Bleeker, Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* p. 38.

D. $\frac{6}{47-49}$. A. 47–49.

The length of the head is contained ten times and a half or eleven times and a half in the total length, or four-sevenths of the distance between the root of the ventral and the vent. Pectoral very short; dorsal and anal fins more or less continuous with the caudal, and enveloped in thick skin; caudal rather short. The lower jaw with small barbels. Body naked.

Coast of Pondicherry. Estuaries of Surabaya.

a. East Indies. Presented by G. R. Waterhouse, Esq.
b, c. From the Haslar Collection.

3. Amblyopus brachygaster.

D. $\frac{6}{45-47}$. A. 46.

The length of the head is one-ninth of the total (without caudal fin), and only a little less than the distance between the base of the ventral and the vent. Body subcylindrical anteriorly, compressed posteriorly, not very elongate, its greatest depth being one-fourteenth of the total length (the caudal fin included). Teeth strong (about sixteen in the upper jaw and six in the lower); skin of the chin folded, and with short barbels. Eyes invisible. The vertical fins are enveloped in thick skin; the dorsal and anal are separated from the caudal by a deep notch; caudal rhomboid, of moderate length; pectoral short, not quite half the length of the ventral.

East Indies.

a. Adult. From the Collection of the Zoological Society.
b, c. Adult. East Indies. Presented by G. R. Waterhouse, Esq.

	inches.	lines.
Total length	14	0
Height of the body	1	0
Length of the head	1	5
Distance between the base of the ventral and the vent	1	7
Length of the caudal fin	1	1
Total length of the smallest specimen	6	0

The anterior series of strong teeth is separated from the band of villiform teeth by a narrow interspace covered by the mucous membrane. The pharyngeal bones are provided with teeth so minute, that they may be felt rather than seen; the upper pharyngeals are obtusely ovate; the two lower ones are separate from each other, and form together a triangle. The setiform lamellæ on the concave side of the branchial arches are very short, and not toothed. There are four gills; a slit behind the fourth; pseudobranchiæ none.

4. Amblyopus hermannianus.

?? Tænioides hermannianus, *Lacép.* ii. p. 533. pl. 14. fig. 1.
?? Cepola hermanniana, *Shaw, Zool.* iv. p. 191.
Gobioides rubicundus, *Buch. Ham.* pp. 37, 365. pl. 5. fig. 9.
Amblyopus hermannianus, *Cuv. & Val.* xii. p. 159. pl. 350; *Bleeker, Verhand. Batav. Genootsch.* xxv., *Bengal en Hindost.* p. 103.
—— mayenna, *Cuv. & Val.* xii. p. 163.
—— anguillaris, *Richards. Ichthyol. China,* p. 207.
Tænioides cœcula, *Cuv. Règne Anim. Ill. Poiss.* pl. 80. fig. 4.

D. $\frac{6}{37-40}$. A. 36–38. Vert. 11/17.

The length of the head is contained five times and a half to seven times and a half in the total length (without caudal fin), or three- or four-fifths of the distance between the root of the ventral and the vent. Pectoral of moderate length; caudal pointed; dorsal and anal fins continuous with the caudal, and not enveloped in thick skin. Barbels none. Body with rudimentary scales, imbedded in minute cryptæ of the skin.

Brackish waters of Bengal, Hindostan, and China.

a. Adult. Ganges. From Mr. M'Clelland's Collection.
b. Half-grown. China. From the Collection of the East India Company.
c, d, e. East Indies.

5. Amblyopus tænia.

D. $\frac{6}{34}$. A. 33.

Body elongate, compressed, naked, with rudiments of scales posteriorly; it is anteriorly higher than broad, its greatest depth being one-fifteenth of the total length (without caudal). Head elongate, subquadrangular; it is contained eight and a half times in the total length, without caudal, and twice in the distance between vent and base of the ventral fin. Cleft of the mouth of moderate width, with eight long, widely-set teeth in each of the jaws; eyes inconspicuous; barbels none. The vertical fins are slightly contiguous with one another, and not enveloped in a thick membrane. Caudal fin elongate, pointed, its length being four times and two-fifths in the total. Pectoral of moderate length, two-thirds of the length of the head, shorter than the ventral. Greenish-olive (in spirits); caudal blackish.

East Indies.

a. East Indies. From the Collection of the East India Company.

	inches.	lines.
Total length	11	0
Length of the head	1	0
Height of the body	0	7
Length of the caudal fin	2	6
Distance between the base of the ventral and the vent	2	0

6. Amblyopus urolepis.

Bleeker, Sumatra, i. p. 581.

D. $\frac{6}{32}$. A. 34.

The length of the head is one-seventh of the total, the height of the body one-ninth; body anteriorly scarcely higher than broad. Pectoral short; dorsal and anal fins not enveloped in skin. Tail posteriorly with conspicuous scales. Greenish.

Rivers of Palembang (Sumatra).

7. Amblyopus brachysoma.

Bleeker, Sumatra, iii. p. 510.

D. $\frac{6}{29}$. A. 28.

The length of the head is contained six times and a half in the total, that of the pectoral nine times and one-third; dorsal and anal fins not enveloped in skin. Body with small scattered scales, becoming larger posteriorly. Rose-coloured.

Priaman.

8. Amblyopus broussonetii.

Gobioides broussonetii, *Lacép.* ii. p. 280; *Cuv. & Val.* xii. p. 139. pl. 348 (bad); *Cuv. Règne Anim. Ill. Poiss.* pl. 80. fig. 3.
Gobius oblongus, *Bl. Schn.* p. 548.

D. $\frac{6}{16}$. A. $\frac{1}{15}$.

The height of the body is one-eleventh of the total length; dorsal fin not elevated; caudal lanceolate. Brownish, with darker spots.

Coasts of Peru and Guayaquil.

a–b. Adult. Guayaquil.
c. Adult: skin. From Gronow's Collection.

In consequence of the bad state of preservation of the single specimen in the Paris Museum, Valenciennes has not recognized the close affinity of this species with those from the East Indies; and the description given by the French naturalist, and still more the figure, are incorrect in several respects. The dentition does not differ from that of the Indian species, the teeth of the outer series being rather smaller and more numerous. The eye, so distinctly represented by Valenciennes, is small and indistinct. The situation of the six dorsal spines is exactly the same as in the East Indian species, the sixth being placed at some distance from the fifth and from the first ray belonging to the soft portion. The vertical fins are contiguous, and the dorsal and anal are separated from the caudal only by a slight notch.

I have preserved the name of *Amblyopus* for the whole genus because it is generally used, and also because such names as *Gobioides*, *Tænioides*, &c., should always be avoided.

Third Group. TRYPAUCHENINA.

The two dorsal fins united into one. Vertebræ 10/24.

17. TRYPAUCHEN.

Trypauchen, *Cuv. & Val.* xii. p. 152.

Body elongate, covered with minute scales; head rather compressed. A deep cavity above the operculum, not communicating with the branchial cavity. Teeth in a band, without canines. One dorsal, the spinous portion composed of six spines; dorsal and anal continuous with the caudal. Ventral fins united.

East Indian Seas.

1. **Trypauchen vagina.**

Gobius vagina, *Bl. Schn.* p. 73.
Gobioides ruber, *Buch. Ham.* pp. 38, 365.
Trypauchen vagina, *Cuv. & Val.* xii. p. 153. pl. 351; *Richards. Ichth. Chin.* p. 206; *Bleeker, Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* pp. 5, 37; *Cantor, Catal.* p. 190.

B. 4. D. $\frac{6}{41-49}$. A. 40–46. Vert. 10/24.

Reddish (during life); brownish (in spirits).

East Indian Seas.

a–c. Adult and half-grown. Madras. Presented by T. C. Jerdon, Esq.
d, e. Half-grown. Pinang. From Dr. Cantor's Collection.
f. Half-grown: skin. Pinang. From Dr. Cantor's Collection.
g. Half-grown. Ceram. From the Collection of Madame Ida Pfeiffer.
h–i, k–m. Adult and half-grown. Amoy. Purchased.
n–o, p. Adult. China.
q–u, v–x, y–z, α, β. Half-grown and young. East Indies.

2. **Trypauchen microcephalus.**

Bleek. Act. Soc. Sc. Indo-Nederl. vi., *Borneo,* xiii. p. 62.

D. $\frac{6}{50}$. A. $\frac{1}{44}$. L. lat. 65.

The length of the head is contained eight times and a half in the total; skin of the head with cells, giving it a reticulated appearance. The ventral disk is deeply notched posteriorly, each half having only four soft rays. Uniform rose-coloured. (*Bl.*)

Fresh waters of Sungi-duri (Borneo).

18. TRYPAUCHENICHTHYS.

Trypauchenichthys, *Bleek. Act. Soc. Sc. Indo-Nederl.* vi., *Borneo,* xiii. p. 63.

Body elongate, compressed, covered with cycloid scales. A band of small teeth in each jaw. Eyes very small, scarcely visible; a deep blind cavity above the operculum. One dorsal fin, with six feeble spines; vertical fins contiguous. Ventral fins entirely disconnected, with only four soft rays. Branchiostegals four.

Rivers of Borneo.

1. Trypauchenichthys typus.

Bleeker, l. c.

$D. \frac{6}{56-59}. \quad A. \frac{1}{49-51}.$ L. lat. 50–55.

Ventral fin with the spine broad, and with the two inner rays rudimentary, situated a little before the pectoral. Rose-coloured. (*Bl.*)

Sungi-duri.

Fourth Group. CALLIONYMINA.

Ventral fins widely apart from each other. Vertebræ 11/16–8/13.

19. PLATYPTERA.

Platyptera, (*Kuhl & v. Hass.*) *Cuv. & Val.* xii. p. 320.

Head rather depressed and broad; body and tail subcylindrical, covered with ciliated scales of moderate size. Cleft of the mouth narrow, with the upper jaw protractile. Eyes of moderate size. Teeth very small, palate smooth. Præoperculum not armed. Two dorsal fins, the anterior with seven flexible spines; pectorals large; ventrals widely apart from each other. Gill-openings of moderate width; branchiostegals six; gills four; pseudobranchiæ; air-bladder none.

Fresh waters of Bantam and Celebes. Wanderer Bay.

1. Platyptera aspro.

Platyptera aspro, (*v. Hass.*) *Cuv. & Val.* xii. p. 321. pl. 360; *Bleek. Celeb.* viii. p. 310.

Platypterus flavescens, *Valenc. in Cuv. Règne Anim. Ill. Poiss.* pl. 83. fig. 1.

B. 6. $D. 7 \mid \frac{1}{8}. \quad A. \frac{1}{8}.$ V. 1/5. L. lat. 35. Vert. 11/16.

Brownish: dorsal fins with two or three series of blackish spots.

a. Adult. Wanderer Bay (fresh water). From the Museum of Economic Geology.

20. CALLIONYMUS*.

Callionymus, *L. Syst. Nat.* i. p. 433.

Callionymus et Synchiropus, *Gill, Proc. Acad. Nat. Sc. Philad.* 1859, p. 125.

Head and anterior part of the body depressed, the rest subcylindrical, naked. Head triangular, with the cleft of the mouth narrow, horizontal, and with the upper jaw very protractile. Eyes of moderate size, more or less directed upwards. Teeth very small, palate smooth. A strong spine at the angle of the præoperculum. Two dorsal fins, the anterior with three or four flexible spines; ventrals five-rayed, widely apart from each other. Gill-openings very narrow, generally reduced to a foramen on the upper side of the operculum; branchiostegals six; air-bladder none; pseudobranchiæ, a slit behind the fourth gill.

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* 1. Callionymus reticulatus, *Cuv. & Val.* xii. p. 284.—Mediterranean.
2. —— fasciatus, *Cuv. & Val.* xii. p. 285; *Guérin, Iconogr. Règne Anim. Poiss.* pl. 40. fig. 2.—Mediterranean. 3.

Sea-fishes living on the bottom near the shore. Temperate seas of the Old World; Indian Ocean, from the coast of Mozambique to the Islands of the Western Pacific.

These fishes exhibit sexual differences in the structure of the fins and in the coloration.

The species may be divided into the following groups:—

α. Gill-opening a very small foramen on the upper surface of the head. Lateral line single (p. 139).

β. Gill-opening a very small foramen on the upper surface of the head. Lateral line double (p. 149).

γ. Gill-opening somewhat dilated, rather more on the side of the head. No detached ventral ray. (*Synchiropus*, Gill.) (p. 149).

α. *Species with a very small gill-opening on the upper surface of the head. Lateral line single.*

1. Callionymus lyra.

The Dragonet. Fox. Skulpin.

Petiver, Gazophyl. tab. 22. fig. 2; *Seba*, iii. 30. 7; *Ström, Söndm.* i. p. 278; *Borlase, Hist. Cornw.* p. 270. tab. 26. fig. 10; *Duhamel, Pêches*, ii. sect. 5. p. 116. pl. 10.

Cottus, sp., *Gronov. Act. Upsal.* 1740, p. 121. tab. 8.

Callionymus lyra, *L. Syst. Nat.* i. p. 433, and *Faun. Suec.* p. 110; *Bl.* ii. p. 71. taf. 161; *Bl. Schn.* p. 39; *Lacép.* ii. p. 329. pl. 10. fig. 1; *Donov. Brit. Fishes*, i. pl. 9; *Retz. Faun.* p. 313; *Müll. Zool. Dan.* p. 21. pl. 28; *Couch, Trans. Linn. Soc.* xiv. p. 71; *Turt. Brit. Faun.* p. 88; *Flem. Brit. Anim.* p. 208; *Fries, Vet. Acad. Handl.* 1837, p. 39; *Fries och Ekstr. Skand. Fisk.* p. 95. tab. 22 & 23; *Parn. Fishes Frith of Forth*, p. 88; *Cuv. & Val.* xii. p. 266; *Yarr. Brit. Fishes*, 1st edit. i. p. 261, 2nd edit. i. p. 297, 3rd edit. ii. p. 310 (fig. cop. *Fries och Ekstr.*); *Neill, Wern. Mem.* i. p. 529; *Cuv. Règne Anim. Ill. Poiss.* pl. 82. fig. 1; *Nilss. Skand. Fauna, Fisk.* p. 212; *Guichen. Explor. Algér. Poiss.* p. 78.

Callionymus dracunculus, *L. Syst. Nat.* i. p. 433; *Ström, Norske Selsk. Nye Handl.* i. p. 149; *Bl.* ii. p. 84. taf. 162. fig. 2; *Bl. Schn.* p. 40; *Lacép.* ii. p. 335; *Retz. Faun.* p. 313; *Zool. Dan.* i. p. 434; *Turt. Brit. Faun.* p. 89; *Donov. Brit. Fishes*, iv. t. 84; *Johnst. Zool. Journ.* iii. p. 336; *Cuv. & Val.* xii. p. 274; *Yarr. Brit. Fishes*, 2nd edit.

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3. Callionymus orientalis, *Bl. Schn.* p. 41. tab. 6; *Cuv. & Val.* xii. p. 297.—Tranquebar.

4. —— melanotopterus, *Bleek. Natuurk. Tydschr. Nederl. Ind.* 1850, p. 31.—Batavia.

i. p. 302, 3rd edit. ii. p. 315; *Parn. Fishes Frith of Forth*, p. 90; *Guichen. Explor. Algér. Poiss.* p. 79.

Corystion, sp., *Klein, Pisc. Miss.* iv. p. 47. no. 10.

Uranoscopus, sp., *Gronov. Zoophyl.* nos. 204, 205, 206, and *Mus. Ichth.* i. p. 21. no. 63.

Gemmeous Dragonet, *Penn. Brit. Zool.* iii. p. 145. pl. 27, and edit. 1812, iii. p. 221. pl. 31.

Sordid Dragonet, *Penn. Brit. Zool.* iii. p. 224. pl. 32.

Uranoscopus lyra, U. dracunculus, U. micropterygius (male, female and young male), *Gronov. Syst. ed. Gray*, pp. 42, 43.

B. 6. D. 4 | 9. A. 9. C. 10. Vert. 8/13.

Præopercular spine much shorter than the eye, flat, terminating in three triangular processes, two of which are directed upwards; a fourth very small one at the base of the spine, pointing forwards. A brown transverse spot below the last two dorsal rays.

Adult male.—The first dorsal spine exceedingly elongate; anal papilla prominent; snout elongate. Yellowish, beautifully spotted and banded with lilac; the anterior dorsal with several lilac spots, the posterior with four lilac bands. (*C. lyra*, auct. exc. Neill, Fries, et Nilss.)

Immature male.—The first dorsal spine more or less produced into a filament; anal papilla slightly prominent; snout moderately elongate. Yellowish, with brownish, sometimes bluish spots; the anterior dorsal anteriorly yellowish, posteriorly blackish, sometimes spotted; the posterior with an indistinct brownish longitudinal band. (*C. dracunculus*, part., auct.)

Female and young male.—The first dorsal spine not or scarcely prolonged; anal papilla very small, hidden; snout not elongate. Yellowish, with brownish spots; the anterior dorsal anteriorly yellowish, black posteriorly; the posterior with an indistinct brownish longitudinal band. (*C. dracunculus*, part., auct. exc. Neill, Fries, et Nilss.)

German Ocean. Atlantic coasts of Europe. Mediterranean. (Ile de France?)

After the doubt that *C. lyra* and *C. dracunculus* are but males and females of the same species had been raised by Gmelin and Valenciennes, the proof of this being really the case has been given by Neill and Fries; and it is surprising that they are still represented as two different species in the most recent ichthyological accounts. Yarrell himself did not examine the internal parts of the species in question, but was chiefly guided in his opinion by an observation made by the celebrated Dr. G. Johnston of Berwick, who recorded, in the third volume of the 'Zoological Journal,' p. 336, that he had found a Sordid Dragonet (*C. dracunculus*) with a milt, or soft roe. By the examination of only a few specimens, this observation will be found to be correct; but the conclusion drawn from it, that such a male specimen of the Sordid Dragonet is specifically different from the Gemmeous Dragonet, is utterly false. What has been called the Sordid Dragonet comprises, namely, not only the females of the species, but also the immature males, which, in the form of the head and of the fins, and in coloration, resemble the females, exactly as is the case in Gallinaceous birds. The proof of this is easily established:—

1. There has never been found a female or a young specimen among the individuals called *C. lyra*, L., or Gemmeous Dragonet.

2. A gradual development in the prolongation of the dorsal fin, of the snout, and of the anal papilla, and a gradual change in the colours are observed in the male individuals, and are always found in accordance with the size, that is, with the age, of the individual.

3. All the females observed belong to the form which is called *C. dracunculus*, L., or the Sordid Dragonet.

A difference in the habits of the Gemmeous and the Sordid Dragonet, observed by Mr. Couch, has also been brought forward as a proof of their specific distinctness:—"The Yellow Skulpin (Gemmeous D.) prefers deeper water, whereas the other will often approach the margin of the tide." Such a difference in habit is to be observed in almost all fishes, larger individuals not being found in localities where smaller ones abound; young fishes, besides, are generally more active in their habits than old ones.

Callionymus lyra offers another instance of the great variation to which many species of fishes are subjected by age or sex. In some of them, as in the present species, one or several organs assume greater proportions with age, in others the same organs appear much more developed in youth (*Xiphias gladius, Stromateus, Platax*). In some species this change is confined to one of the sexes only, whilst in others it affects both.

The following specimens are in the British Museum Collection:—

a. Adult male. England.
b–d. Adult female and half-grown. Mouth of the Thames. Mus. Leach.
e, f–g. Half-grown males. Brighton.
h–i. Adult males. Falmouth.
k. Adult male. Plymouth. Mus. Leach.
l. Adult male: skin. Plymouth. From Mr. Yarrell's Collection.
m. Adult male. Hythe. Presented by H. B. Mackeson, Esq.
n. Adult male. Sandgate. Presented by the Rev. G. Smith.
o–p. Half-grown males: skins. River Tawar. From Mr. Yarrell's Collection.
q–r. Adult males. Lisbon. Presented by the Rev. R. T. Lowe.
s. Half-grown male. Adriatic. Purchased of Mr. Frank.
t. Half-grown male. Ile de France. Mus. Leach.
u. Adult female. Ile de France. Mus. Leach.
v, w, x–y. Adult males.
z–γ. Adult males: skins.
δ. Adult female: skin. From Mr. Yarrell's Collection.
ε. Adult female. From the Haslar Collection.
ζ. Half-grown male.
η. Adult male: skin.
θ. Half-grown male: skin. } From Gronow's Collection.
ι. Adult female: skin.

κ. Adult male: skeleton: not good state. Purchased.
λ. Adult male: skeleton. Polperro. Presented by J. Couch, Esq.

Skeleton.—The skeleton of *Callionymus* resembles that of the typical *Gobiina* with regard to the form of the cranium and the thin osseous layers of the single bones, but shows several very remarkable peculiarities:—

1, in the structure of the facial bones;
2, in the arrangement of the opercular bones;
3, in the structure of the humeral arch;
4, in the three joints between occipital and first vertebra, situated on the same horizontal line;
5, in the small number of vertebræ.

The great protractility of the jaws is effected by the extreme prolongation of the processes of the intermaxillary bones; they are much longer than the body of the bones, moving in a broad shallow groove formed by the ethmoid, nasal and præfrontal bones, and extending backwards in a cavity of the interorbital space. They are slightly curved, so that when the upper jaw is protracted, it assumes a downward direction. The maxillary is shorter than the intermaxillary and scarcely dilated; its extremity is received in a shallow groove formed by a vertical ridge of the posterior portion of the mandibula. The mandibles are long, slender, the symphysial angle being rather acute. The præorbital is thin, very long, extending nearly to the end of the snout; infraorbital bones none. The anterior part of the vomer projects into the mouth, and its body is rather broad and flat, tapering posteriorly. The pterygoid bones are very narrow, the pretympanic and mesotympanic very small, leaving a very wide and free space below the large orbit. The hypotympanic is elongate, and has a very strong longitudinal crest; it is as long as the præoperculum; the latter has no ascending, only a horizontal, limb, the former part being entirely replaced by the epitympanic; immediately behind the epitympanic there is the narrow operculum, which is much smaller than the suboperculum. The suboperculum is similar in form to an operculum, and occupies the space in which, in other fishes, the latter bone is usually found; it is very thin, striated, and has the margin fringed. The interoperculum is continuous with the suboperculum, forming a narrow, thin, elongate lamella.

The hypotympanic and the præoperculum are provided with a bony keel or crest, which extends from the joint of the mandible to the base of the præopercular spine; another bony keel runs downwards from the joint of the epitympanic to the same spot, meeting the first keel at an acute angle. It is evident that these two keels serve to support the præopercular spine: this would have been far less the case if they had met at a right angle; but in the direction in which they are placed, they answer fully the same purpose as that peculiar process which is found on the cheek of the true Cottoids. Branchiostegals filiform.

The crown of the head is rather flat, about twice as broad as long, each parietal having a slight porous protuberance on the centre; the frontal bones form a very narrow bridge between the orbits, and converge anteriorly to receive the processes of the intermaxillary. A short and flat process on the occiput indicates the occipital crest. The first vertebra is joined to the occiput by three concave grooves, which are situated on the same level, whilst the lateral ones stand above the central groove in the other Gobioid fishes.

The suprascapula is narrow, styliform, and directed outwards, having quite a horizontal situation. In consequence of the depressed and broad form of the trunk, the humerus is low, strongly bent inwards to meet its fellow, its lower horizontal portion being much longer than the vertical. There are two processes arising from its vertical portion; they are horizontally directed backwards: the upper serves for the attachment of the ulna, whilst the lower is shorter, terminating in a free point, covering and supporting the pectoral muscles. The radius is fixed to the humerus, inside of the latter process. The longitudinal axes of the pubic bones are directed outwards from within, and not from before towards behind, as in other fishes; the axes of both are in nearly the same transverse line: three processes arise from the base of each of the bones, two of which are flat and fixed to the humerus, whilst the third is tubiform and meets its fellow of the other side.

There are eight abdominal and thirteen caudal vertebræ; they become gradually flatter and longer posteriorly, and the last is as long as the first two together. The length of the abdominal portion of the vertebral column is to that of the caudal as 1 : 2·5. The neural spines of the first three vertebræ are extremely short, whilst the first interneural, which is situated above the second and third vertebræ, is broad and lamelliform. The fourth and fifth vertebræ have broad triangular neurals; the lateral parts of the neural of the sixth are very large and divergent, like those of the hæmal of the eighth. The neurals of the caudal vertebræ are depressed and very short, with the lateral portions divergent. The interneurals of the soft dorsal fin are nearly entirely reduced to a small horizontal bone, which is joined to the preceding and following; a very feeble process descends from each horizontal portion towards the neurals; the hæmal and interhæmal spines are similar to the neurals and interneurals. The last vertebra is as long as the preceding one, its posterior portion being produced into a flat lamella, to which the caudal rays are joined. Ribs feeble, without epipleurals.

	lines.
Length of the abdominal portion	20
——— of the caudal portion	45
——— of the first vertebra	2½
——— of the second vertebra	2
——— of the fourth vertebra..............	2¼
——— of the eighth vertebra..............	3
——— of the thirteenth vertebra	3½
——— of the twenty-first vertebra	4½

2. Callionymus maculatus.

Dracunculus, *Rondel.* x. cap. 12. p. 304; *Aldrov.* ii. cap. 51. p. 262; *Willughby*, p. 136. tab. H. 6. fig. 3; *Ray*, p. 79.
Cottus, sp. 5, *Artedi, Genera*, p. 49, and sp. 4. *Synon.* p. 77.
Callionymus maculatus, (*Rafin.*) *Bonap. Faun. Ital. Pesci*, fig. 2 male, fig. 3 fem.; *Schagerstr. Vet. Akad. Handl.* 1833, p. 133; *Fries, ibid.* 1837, p. 48; *Fries och Ekstr. Skand. Fisk.* p. 102. pl. 24; *Nilss. Skand. Faun. Fisk.* p. 216.
—— lyra, *Risso, Ichthyol. Nice*, p. 113, and *Eur. Mérid.* iii. p. 262.
—— dracunculus, *Brünn. Pisc. Mass.* p. 17; *Nardo, Prodr. Adr. Ichth.* sp. 46.
—— cithara, *Cuv. Règne Anim.*; *Cuv. & Val.* xii. p. 280.

D. 4 | 9. A. 8–9. C. 10.

Præopercular spine much shorter than the eye, tapering behind and terminating in three small processes, two of which are directed upwards; a fourth small one at the base of the spine, pointing forwards. Pearl-coloured spots on the side of the body.

Adult male.—Dorsal fins very elevated, with dark ocelli between the rays.

Female.—Dorsal fins not elevated, with dark dots.

Mediterranean. Occasionally on the coast of Scandinavia.

a–b. Adult males. Adriatic.
c. Adult males. Sicily. Presented by W. Swainson, Esq.
d. Female. South Europe. Presented by R. B. Webb, Esq.

3. Callionymus festivus.

Dracunculus, *Rondel.* i. lib. x. cap. 12. p. 304; *Aldrov.* ii. cap. 51. p. 262; *Jonst. Pisc.* i. p. 61. tab. 21. fig. 4; *Gesner, Aquat.* iv. p. 50; *Willughby, Ichthyol.* iv. cap. 25. p. 136. tab. H. 6. fig. 3; *Ray, Syn.* p. 79.
Cottus, sp., *Artedi, Syn.* p. 77. no. 4, and *Genera*, p. 49. no. 5.
Callionymus dracunculus, *Risso, Ichth. Nice*, p. 104; *Bonap. Faun. Ital. Pesc.* c. fig. male and female (not *auct.*).
—— festivus, *Pall. Zoogr. Ross.* iii. p. 146; *Eichw. Zool. Spec.* iii. p. 78; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 443. pl. 13. figs. 1-3; (not *Bonap.*).
—— pusillus, *De la Roche, Ann. Mus.* xiii. p. 330. pl. 25. fig. 16; *Risso, Eur. Mérid.* iii. p. 264 (fem.).
—— admirabilis, *Risso, l. c.* pl. 6. fig. 11.
—— lacerta, *Cuv. Règne Anim.*; *Cuv. & Val.* xii. p. 286; *Guichen. Explor. Algér. Poiss.* p. 79.

D. 4 | 7. A. 9. C. 10.

The præopercular spine is tricuspid; the anterior dorsal not elevated.

Male.—Posterior dorsal very elevated, caudal much produced; a series of silvery vertical stripes, darker-edged, along the side of the body.

Female.—None of the fins produced; silvery dots on the sides, edged with darker; anal with the margin black.

Mediterranean.

4. Callionymus belenus.

Belennus, *Rondel. Pisc.* i. lib. vii. cap. 9. p. 214; *Gesner, Aquat.* ix. p. 125.
Callionymus belenus, *Risso, Eur. Mérid.* iii. p. 263; *Bonap. Faun. Ital. Pesc.* c. fig. male and fem.; *Cuv. & Val.* xii. p. 294.
—— elegans, *Lesueur, Nouv. Bull. Sc. Soc. Philom.* 1814, p. . pl. 1. fig. 17.
—— rissoi, *Lesueur, Nouv. Bull. Sc. Soc. Philom.* p. 76. tab. 16; *Cuv. & Val.* xii. p. 293.
—— lyra, *Nardo, Prodr. Adr. Ichth.* sp. 45.
—— sueurii, *Cuv. & Val.* xii. p. 291.

D. 3 | 8. A. 8. C. 10.

The spine of the præoperculum is slender, tricuspid; the anterior dorsal small, much lower than the posterior. Greenish; anterior dorsal black superiorly.

Male with the last dorsal ray produced.

Mediterranean.

5. Callionymus curvicornis.

Callionymus curvicornis, *Cuv. & Val.* xii. p. 298.
—— japonicus, *Cuv. & Val.* xii. p. 299 (not *Houtt.*).
—— valenciennesii, *Schleg. Faun. Japon. Poiss.* p. 153. pl. 78. fig. 3; *Bleek. Verhand. Batav. Genootsch.* xxv., *Japan*, p. 45.
? Callionymus reevesii, fem., *Richards. Voy. Sulph. Fishes*, p. 60. pl. 36. fig. 4, and *Ichthyol. Chin.* p. 210.
Callionymus punctatus, (*Langsd.*) *Richards. Ichthyol. Chin.* p. 210.
? Callionymus richardsonii, *Bleek. Japan*, p. 414, and *Verhand. Batav. Genootsch.* xxvi., *Japan*, p. 111.

D. 4 | 9. A. 8–9. C. 11.

Præopercular spine nearly as long as the orbit, cylindrical, curved upwards, terminating in four hook-like processes, one of which is directed backwards; a fifth at the base of the spine, pointing forwards. Head of moderate size, its length being contained three times and a fourth in the total (without caudal).

Adult male.—Dorsal fins elevated, the anterior with blackish spots; caudal elongate.

Female.—Dorsal fins not elevated, the anterior dorsal with a large black, white-edged spot posteriorly; caudal of moderate length.

Bourbon. Coasts of China and Japan.

a–e, f–g, h. Adult and half-grown. China.
i–l. Adult: dried. From Chinese insect-boxes.
m. Half-grown. From the Haslar Collection.

6. Callionymus huguenii.

Bleeker, Act. Soc. Sc. Indo-Nederl. v., *Japan*, v. p. 7. tab. 2. fig. 1.

D. 4 | 10. A. 10. C. 12.

Præopercular spine not longer than the eye, terminating in three large curved processes; a fourth at the base of the spine, pointing forwards. The length of the head is contained three times and one-third in the total (the caudal fin not included). The first dorsal fin with filiform spines, the first being the longest; the soft dorsal not much higher than the body; caudal fin pointed, as long as the head. Greenish, clouded with darker and dotted with white; head with blue ocelli; the anterior dorsal immaculate, the posterior with brownish dots; anal with a blackish margin; caudal rays with brown spots disposed in five or six transverse series.

Sea of Nagasaki.

Described by Dr. v. Bleeker from a single specimen, which appears to be a male.

7. **Callionymus lunatus.**

Schleg. Faun. Japon. Poiss. p. 155. pl. 78. fig. 4.

D. 4 | 9. A. 9. C. 10.

Præopercular spine? The first dorsal spine produced into a long filament; a crescent-shaped black spot on the margin of the membrane behind the fourth dorsal spine. (*Schleg.*)

Japan.

8. **Callionymus hindsii.**

Richards. Voy. Sulph. Fishes, p. 64. pl. 37. figs. 3, 4.

D. 3 | 9. A. 9. C. 12.

Præopercular spine short, half as long as the eye, terminating in three small hook-like processes, two of which are directed upwards; a fourth at the base of the spine. Head very depressed. The anterior dorsal fin is elevated, with alternate milk-white and black cross-bars.

Pacific.

a–b, c, d. Three to four inches long: bad state. Pacific. Presented by Captain Sir E. Belcher, C.B.—Types of the species.

9. **Callionymus sagitta.**

Callionymus sagitta, *Pall. Spicileg.* viii. p. 29. tab. 4. figs. 4, 5; *Cuv. & Val.* xii. p. 301; *Bleek. Natuurk. Tydschr. Nederl. Ind.* i. 1850, p. 31.

—— serrato-spinosus, *Gray, Illustr. Ind. Zool.* (fem.).

D. 4 | 9–10. A. 9. C. 11.

Præopercular spine stout, depressed, nearly as long as the diameter of the eye, with four hook-like teeth, directed inwards; a fifth at the base of the spine, pointing forwards. Head large, very depressed, its length being contained twice and two-thirds in the total (without caudal fin). The anterior dorsal fin short and low. Brownish, with numerous darker ocelli; anterior dorsal blackish.

Bourbon. East Indies.

a. Half-grown. Bay of Bengal. From Dr. Cantor's Collection.
b–d. Half-grown. Madras. Presented by T. C. Jerdon, Esq., M.D.
e–g. Half-grown. East Indies. Presented by G. R. Waterhouse, Esq.

10. Callionymus phaëton.

? Callionymus sagitta, *Risso, Ichth. Nice,* p. 105.
? —— morrissonii, *Risso, Eur. Mérid.* iii. p. 265. fig. 12.
Callionymus festivus, *Bonap. Faun. Ital. Pesc.* c. fig. male and fem.; (not *Pall.*).

D. 4 | 9. A. 8. C. 10.

The spine of the præoperculum is bicuspid. Reddish, variegated with green.

Male.—The last dorsal ray and the two middle caudal rays produced into filaments.

Female.—None of the rays produced. (*Bonap.*)

Mediterranean.

11. Callionymus altivelis.

Schleg. Faun. Japon. Poiss. p. 155. pl. 79. fig. 1.

D. 4 | 8. A. 7. C. 10.

Foramen branchiale on the upper side of the neck*. Præopercular spine bifurcate. Dorsal fins elevated; the origin of the anterior is in the vertical from the gill-opening. Caudal long. Uniform yellowish (in spirits).

Bay of Ohomura.

12. Callionymus calauropomus.

Richards. Voy. Ereb. & Terr. Fishes, p. 10. pl. 7. figs. 4, 5.

D. 4 | 8. A. 7. C. 10.

Foramen branchiale on the upper side of the neck. Præopercular spine bifurcate. Dorsal fins not elevated; the origin of the anterior is in the vertical from the gill-opening. Caudal of moderate length. Bronze-coloured (in spirits), clouded with darker; anterior dorsal blackish superiorly.

This is, perhaps, the female of *C. altivelis.*

North-west Australia.

a. Type of the species. From the Haslar Collection.

13. Callionymus filamentosus.

Cuv. & Val. xii. p. 303. pl. 359; *Bleek. Amb. & Cer.* p. 278.

D. 4 | 9. A. 9. C. 14.

Præopercular spine straight, rather longer than the eye, serrated superiorly, and with a process anteriorly, pointing forwards.

Male.—The first dorsal spine, the last ray of the dorsal and anal fins, and the two middle caudal rays produced into long filaments; anal papilla well developed.

Female.—None of the rays elongate; anal papilla short.

Coasts of Celebes and Amboyna.

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* Schlegel says that this species belongs to the division "à orifice branchial reculé en arrière et vers le bas;" but by the figure quoted, and by the close affinity of this species with the following, I am induced to believe that the gill-cavity opens superiorly, and not laterally.

14. Callionymus schaapii.

Bleeker, Banka, p. 455.

D. 4 | 10. A. 10. C. 10.

The præopercular spine is curved, and has six tooth-like processes, and a seventh at its base.

Male.—Dorsal spines and the posterior dorsal rays elongate; caudal fin one-third of the length of the body. Olive, variegated with brown; dorsal rays, posterior part of the base of the anal fin, and anterior rays of the pectoral brown-dotted; ventrals and anal black-edged. (*Bl.*)

Female —— ?

Sea of Banka.

15. Callionymus longecaudatus.

Callionymus japonicus, *Houtt. Verh. Holl. Maatsch. Wet. Haarl.* xx. p. 311 (not *Val.*).

—— longicaudatus, *Temm. & Schleg. Faun. Japon. Poiss.* p. 151. pl. 78. figs. 1, 2, pl. 79. A. fig. 1; *Bleek. Act. Soc. Sc. Indo-Nederl.* iii., *Japan*, p. 17 (Japanese variety).

—— reevesii, *Richards. Voy. Sulph. Fishes*, p. 60. pl. 36. figs. 1–3 (not fig. 4), and *Ichth. Chin.* p. 211; *Bleek. Ceram*, iii. p. 244 (Chinese variety); *Bleek. Nalez. Ichth. Jap.* p. 44.

—— variegatus, *Schleg. Faun. Japon. Poiss.* p. 153 (fem.).

—— belcheri, *Richards. Voy. Sulph. Fishes*, p. 62. pl. 37. figs. 1 & 2.

D. 4 | 9. A. 9. C. 11.

Præopercular spine straight, as long as the diameter of the eye, finely serrated superiorly; a strong spinous process at its base, pointing forwards.

Male.—Spines of the anterior dorsal filiform, of moderate length. Caudal exceedingly elongate, sometimes as long as the body: *C. longecaudatus*, Schleg.

Female.—Spines of the anterior dorsal short; caudal of moderate length: *C. variegatus*, Schleg.

Coasts of China, Japan, Ceram, Amboyna, and Celebes.

a. Adult. China. From the Haslar Collection.
b–i. Adult: dried. From Chinese insect-boxes.
k. Half-grown. China. Presented by Captain Sir E. Belcher, C.B.
l, m, n. Young. China. Presented by Captain Sir E. Belcher, C.B.

Some of the young specimens have the præopercular spine a little more coarsely denticulated and slightly bent outwards. These have been called by Sir J. Richardson *Callionymus belcheri* (Voy. Sulph. Fishes, p. 62. pl. 37. figs. 1 & 2).

o. Four inches long: not good state. Pacific. Presented by Captain Sir E. Belcher, C.B.—Type of *C. belcheri*.
p–q. Two to three inches long. China. Presented by Captain Sir E. Belcher, C.B.

It appears, from the researches of Dr. Bleeker, that specimens from China differ from those from Japan in having blackish spots on the second dorsal and on the pectoral; he retains the name of *C. reevesii* for the former, and that of *C. longecaudatus* for the latter. As all the specimens in the British Museum are from China, they should be named *C. reevesii*, although the spots have nearly faded away in consequence of the long period of their preservation.

16. Callionymus simplicicornis.

Cuv. & Val. xii. p. 303.

D. 4 | 8. A. 7.

Præopercular spine straight, very finely serrated. Brownish, with small darker rings. (*Val.*)

Sea of Guam.

β. A very small gill-opening on the upper surface of the head. Lateral line double.

17. Callionymus goramensis.

Bleeker, Goram, p. 214.

D. 4 | 9. A. 7. C. 10.

Two lateral lines on each side. Præopercular spine with five or six tooth-like processes, and with a seventh at its base. The first dorsal spine and the last ray of the dorsal and anal fins produced. Fins dotted with blue; anal with a brown longitudinal band; the lower half of the caudal with five or six transverse series of brown spots. (*Bl.*)

Sea of Goram.

γ. Gill-opening somewhat widened, rather more on the side of the head. No detached ventral ray. (Synchiropus, *Gill.*)

18. Callionymus lineolatus.

Callionymus lineolatus, *Cuv. & Val.* xii. p. 307.
—— lateralis, *Richards. Voy. Sulph. Fishes,* p. 65. pl. 37. figs. 5 & 6.

D. 4 | 8. A. 7.

Foramen branchiale on the side of the neck, covered by the extremity of the operculum, which is not produced. Præopercular spine straight, rather shorter than the eye, with two tooth-like processes superiorly; none at the base.

Male.—The anterior dorsal is elevated. Body brownish, marbled with darker; irregular pearl-coloured, dark-edged spots and lines on the sides. The anterior dorsal blackish between the first and second spines, the remainder of the fin with irregular pearl-coloured spots and lines, edged with darker; the posterior with five brown bands, descending obliquely backwards, and with a few whitish dots on the base; caudal with two approximate brown cross-bars accompanied by whitish dots; anal blackish, with three series of violet ocelli; base of the pectoral and ventral white-spotted.

Female.—Anterior dorsal not elevated; markings indistinct.

Bourbon. Pondicherry. Madras. (Pacific.)

a–b. Adult. Madras. Presented by T. C. Jerdon, M.D.

c. Female. Pacific. Presented by Captain Sir E. Belcher, C.B.—Type of *C. lateralis*.

19. **Callionymus ocellatus.**

Callionymus ocellatus, *Pall. Spicil.* viii. p. 25. tab. 4. figs. 1–3; *Walb. Artedi*, p. 608; *L. Gm.* i. p. 1541; *Bl. Schn.* p. 40; *Cuv. & Val.* xii. p. 308; *Bleek. Amboina*, vi. p. 422.

—— punctulatus, *Lacép.* ii. pp. 328, 340.

D. 4 | 8. A. 7. C. 10.

Gill-opening on the side of the neck, covered by the extremity of the operculum, which is not produced. Præopercular spine straight, shorter than the eye, with two tooth-like processes superiorly; none at the base.

Male.—The anterior dorsal is elevated. Head and body with numerous small blue ocelli; the spinous dorsal rose-coloured, with two curved brown, blue-edged cross-bands inferiorly, and with four brown spots superiorly, black in the centre and edged with blue; soft dorsal with two brown longitudinal streaks, edged with blue and black. Caudal with a brown cross-bar on the base, and posteriorly spotted with brown and dotted with blue. Anal brown, with two blue longitudinal stripes.

Female ——?

Western parts of the East Indian Archipelago.

20. **Callionymus marmoratus.**

Callionymus marmoratus, *Peters in Wiegm. Arch.* 1855, p. 255.

—— perelegans, *Bianc. Spec. Zool. Moss.* p. 263, *Pisc.* fig. 9.

B. 6. D. 4 | 8. A. 7. C. 13.

Foramen branchiale on the side of the neck, but above the root of the pectoral. The operculum is not produced. Præopercular spine somewhat bent inwards and upwards, with two tooth-like processes superiorly; none at the base.

Male.—The anterior dorsal fin is elevated. Brownish, variegated with darker and spotted with white; a broad dark-brown cross-band from the base of the first dorsal to that of the pectoral. Anterior dorsal with numerous interrupted bluish transverse lines, the posterior with series of small brown, white-edged spots; pectoral and caudal with transverse series.

Female.—The anterior dorsal fin is not elevated. Brownish-olive, marbled with darker, reticulated with white; lower part of the sides with pearl-coloured dots and stripes. The anterior dorsal fin is brown, with concentric, interrupted bluish lines; the posterior with six or seven dark-brown longitudinal lines, and with vermiculated white lines. A large semicircular brown spot on the base of the pectoral fin; anal white, with large brown spots; caudal with four or five cross-series of brown dots.

Mozambique.

a. Female. Mozambique. From Prof. Peters's Collection.

21. Callionymus opercularis.

Cuv. & Val. xii. p. 305.

B. 5. D. 4 | 9. A. 9. C. 11.

Foramen branchiale on the side of the neck, covered by the extremity of the operculum, which is produced backwards. Præopercular spine straight, with about six tooth-like processes superiorly; none at the base. The diameter of the eye is two-thirds of the width of the interorbital space. (*Val.*)

Mouth of the river Arian-Coupan.

a–c. Old Collection.

22. Callionymus opercularioides.

Bleek. Natuurk. Tydschr. Nederl. Ind. i. 1850, p. 32.

B. 6. D. 4 | 9. A. 9.

Foramen branchiale on the side of the neck, covered by the extremity of the operculum, which is produced backwards. Præopercular spine straight, with four or five tooth-like processes superiorly; none at the base. The width of the interorbital space is one-half the diameter of the eye. Blackish, with numerous black points; the anterior dorsal and ventral fins black; the rays of the other fins black-dotted. (*Bl.*)

Seas of Padang (West Sumatra) and of Batjan.

21. VULSUS.

Callionymus, sp., *Cuv. & Val.*
Dactylopus*, *Gill in Proc. Acad. Nat. Sc. Philad.* 1859, p. 130.

Head and anterior part of the body not much depressed; the rest subcylindrical, naked. Cleft of the mouth narrow, horizontal, with the upper jaw protractile. Eyes of moderate size. Teeth very small, palate smooth. A strong spine at the angle of the præoperculum. Two dorsal fins, the anterior with four flexible spines; ventrals five-rayed, widely apart from each other. The outer ventral ray is detached from the fin. Gill-opening reduced to a small slit behind the operculum; four gills; pseudobranchiæ; six branchiostegals; air-bladder none.

Sea of Amboyna.

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* Preoccupied.

1. Vulsus dactylopus.

Callionymus dactylopus, (*Benn.*) *Cuv. & Val.* xii. p. 310; *Bleek. Amboina*, ii. p. 559.
Dactylopus bennettii, *Gill, l. c.*

D. 4 | 8. A. 7. C. 10.

Præopercular spine slightly curved upwards, as long as the orbit, and denticulated superiorly and inferiorly. Dorsal spines produced into long filaments. Brownish, marbled with darker, and with numerous blue ocelli; the anterior dorsal with a large black ocellus between the third and fourth spines; the posterior brownish, with five or six interrupted brown longitudinal bands; the upper half of the caudal fin with five brown cross-bands, alternating with yellow ones; the lower half dotted with black, and with short blue, black-edged lines.

Coasts of Amboyna and Celebes.

a. Fine specimen. Amboyna. From Madame Ida Pfeiffer's Collection.
b. Adult. Amboyna. Purchased of Mr. Frank.

Appendix.

LUCIOGOBIUS.

Luciogobius, *Gill in Proceed. Acad. Nat. Sc. Philad.* 1859, p. 146.

Body elongate, naked; head depressed, with the cleft of the mouth nearly horizontal. Gill-openings small, vertical, in front of the base of the pectorals. Eyes small. Teeth in a band, those of the outer series being the strongest. One short dorsal fin, without distinct spines, situated on the tail; anal opposite the dorsal. Ventrals small, united in a simple infundibuliform basin. Branchiostegals four.

Coast of Japan.

1. Luciogobius guttatus.

Gill, l. c.

D. 14. A. 13. V. 1/5.

The height of the body is one-twelfth or one-thirteenth of the total length, the length of the head two-ninths. Eyes widely separated; the cleft of the mouth extends to below the eye. Brown, dotted with black. (*Gill.*)

Coast of Japan.

It would appear, from the description of the ventral fins of this genus, that it will form the type of a separate family, intermediate between the *Gobiidæ* and *Gobiesoces.*

Bleeker refers to the Gobioids the following genus, which is marked by such singular characters, that it will probably form the type of a distinct family. It is distinguished from the Gobioids by a considerably wider gill-opening, and by the ventral fins, which have only four soft rays. It would be rather hazardous, and of no advantage to science, to found a separate family on it, as nothing whatever is known of its internal structure, and as we have not had an opportunity of seeing the only specimen at present known to exist in Collections.

OXYMETOPON.

Bleeker, Timor, vi. p. 12.

Body elongate, strongly compressed; head compressed into a keel superiorly. Canine teeth; palate smooth; none of the bones of the head armed. The inferior pharyngeal bones are armed with villiform teeth, not united, but forming a triangle together. Scales ctenoid, lateral line none. Two dorsal fins, which are contiguous at the base; the first is short, and composed of flexible spines; the second is elongate, like the anal. Ventral fins inserted behind the base of the pectoral, composed of one spine and four soft rays. Branchiostegals five. Gill-opening wide. An anal appendage.

Sea of Timor.

1. Oxymetopon typus.

Bleeker, l. c. p. 13.

D. $6\,\big|\,\frac{1}{31}$. A. $\frac{1}{31}$. C. 30. P. 20–21. V. 1/4. L. lat. 105.

The height of the body is contained seven times and a half in the total length; its width is one-fourth of its depth. The length of the head is nearly one-tenth of the total (the caudal fin not included). The upper part of the head is compressed into a fleshy, scaly crest; its upper profile is very convex, concave before the eyes. The diameter of the eye is contained thrice and a fourth in the length of the eye, and is equal to the width of the interorbital space. Snout very short; cleft of the mouth very oblique; maxillary extending to below the anterior half of the eye; lower jaw prominent. The teeth of both jaws stand in several series, the outer of which contains larger ones. The upper jaw anteriorly with four canine teeth standing without the series; the lower jaw with four canines on and near the symphysis. The scales on the posterior part of the tail are larger than the anterior ones. Caudal fin elongate, pointed, its length being thrice and a third in the total length. Rose-coloured, with two oblique blue streaks on the cheek; dorsal fins with three or four blue longitudinal lines; anal fin violet; caudal with small bluish ocelli. (*Bl.*)

Sea of Timor.

Fam. 20. DISCOBOLI.

Discoboli, pt., *Cuv. Règne Anim.*; *Müller, Berl. Abhandl.* 1844, p. 158.

Body thick or oblong, naked or tubercular. Teeth small. One or two dorsal fins; the anal similarly developed as the soft dorsal. *Ventrals with one spine and five rays, all being rudimentary, and forming the bony centre of a round disk, which is surrounded by a cutaneous margin.* Gill-openings narrow, the gill-membranes being attached to the isthmus; three gills and a half; air-bladder none. Pyloric appendages in great number.

Carnivorous fishes, living at the bottom of the shores of the northern seas. They are enabled to attach themselves very firmly to rocks, &c., by means of the ventral disk.

The family of Discoboli has hitherto comprised two very heterogeneous divisions of fishes. The present family is composed of those only which are truly acanthopterous, which have the ventral disk formed only by the ventral fins, the skeleton but slightly osseous, and numerous pyloric appendages. They differ, besides, from the *Gobiesocidæ* in a great many other points. They approach closely to the *Gobiidæ*, from which they are distinguished by the complete transformation of the ventral fins into an adhesive organ, by the numerous pyloric appendages, &c.

Synopsis of the Groups.

Two separate dorsal fins. Vertebræ 12/16 .... *a.* **Cyclopterina.**
One dorsal fin. Infraorbital joined to the præoperculum. Vertebræ 12/30 .... *b.* **Liparidina.**

First Group. CYCLOPTERINA.

Only one genus.

1. CYCLOPTERUS.

Cyclopterus, *Artedi, Genera*, p. 61; *Cuv. Règne Anim.*

Body thick, more or less elevated; skin viscous, tubercular. Head large, snout short. Two dorsal fins, the anterior formed by flexible spines. Ventral fins composed of one spine and five rays, all united into a more or less circular disk. A villiform band of teeth in the jaws, palate smooth. Three gills and a half, pseudobranchiæ; branchiostegals six. Gill-opening narrow, the gill-membranes being united below the throat and firmly attached to the isthmus. Skeleton but slightly osseous. Pyloric appendages numerous.

Northern seas of both hemispheres.

1. Cyclopterus lumpus.

Lump-Sucker. Cock and Hen Paidle. See-hase.
Cyclopterus gibbosus, *Willughby*, p. 209. tab. N. 10. fig. 2.
Lumpus anglorum, *Aldrov.* iii. c. 68. p. 479; *Jonst.* i. tit. 1. cap. 3. art. 3. punct. 12. p. 42. tab. 13. fig. 1; *Willughby*, p. 208. tab. N. 11; *Ray, Syn.* p. 77.
Lepus marinus, *Schonev.* p. 41.
Cyclopterus, sp., *Artedi, Gen.* p. 62; *Gronov: Mus. Ichthyol.* i. p. 56; *Gouan, Hist. Pisc.* p. 223.
Cyclopterus lumpus, *L. Syst. Nat.* i. p. 414, and *Faun. Suec.* p. 320; *Fabr. Faun. Grönl.* p. 131; *Mohr, Islænd. Naturh.* p. 61; *Bl. Fische Deutschl.* ii. p. 103. pl. 90; *Bl. Schn.* p. 197; *Lacép.* ii. p. 52. pl. 3. fig. 1; *Müll. Prodr. Zool. Dan.* p. 39; *Donov. Brit. Fishes*, pl. 10; *Turt. Brit. Faun.* p. 115; *Cuv. Règne Anim.*; *Faber, Fische Isl.* p. 49; *Retz. Faun.* p. 327; *Richards. Faun. Bor. Amer. Fishes*, p. 260; *Ekstr. Fische Mörkö*, p. 108; *Nilss. Prodr.* p. 61, and *Skand. Faun. Fisk.* p. 232; *Fries, Vet. Akad. Handl.* 1838, tab. 4. fig. 1 *a, b, c*; *Düben & Koren, Vet. Akad. Handl.* 1844, p. 116. tab. 3. fig. 8; *Yarr. Brit. Fishes*, 2nd edit. ii. p. 365, 3rd edit. ii. p. 343; *Parn. Wern. Mem.* vii. p. 380, and *Fishes Frith of Forth*, p. 220; *Gronov. Syst. ed. Gray*, p. 39; *Gaim. Voy. Isl. et Grönl. Zool. Poiss.* pl. 8.
Rognkjækse, *Ström, Söndm.* i. p. 302.
Hrognkelsi, *Olafs. Isl. Reise*, § 622 & § 681.
The Lump-sucker, *Penn. Brit. Zool.* iii. p. 133. tab. 21. figs. 1, 2; edit. 1812, iii. p. 176. pl. 24.
Oncotion, nos. 1, 2 & 3, *Klein, Miss. Pisc.* iv. p. 49. tab. 14. fig. 5.
Ascan. Ic. tab. 34.
Cyclopterus pavoninus, *Shaw, Nat. Misc.* ix. p. 310 (young).
—— cæruleus, *Mitch. Trans. Lit. & Phil. Soc. New York*, i. p. 480. pl. 2. fig. 7.
—— coronatus, *Couch, Corn. Faun.* p. 47; *Thomps. Ann. & Mag. Nat. Hist.* v. p. 9.
Gobius minutus, *Müll. Zool. Dan.* p. 38. tab. 154. B. figs. 1–3 (young).
Cyclopterus minutus, *Pall. Spicil. Zool.* vii. p. 12. tab. 3. figs. 7–9; *Richards. Faun. Bor. Amer. Fishes*, p. 262; *Cuv. Règne Anim.*
Lepadogaster minutus, *Bl. Schn.* p. 3.
Skeleton: *Rosenth. Ichthyot. Taf.* t. 19. fig. 1.

D. 4 | 11. A. 9. Vert 12/16.

The anterior dorsal fin distinct only in very young specimens, enveloped in thick skin with age. Gill-opening a vertical cleft above the pectoral. Body tubercular, with four series of larger rough tubercles, one along the base of the anterior dorsal fin, the second from above the eye, the fourth along the side of the belly.

Coasts of Northern Europe, Iceland, and Greenland, extending southwards to the coasts of North Germany, Cornwall, and New York.

a–e. Adult and half-grown: stuffed and skins. British coasts.
f. Young. Scotland.
g–h. Very young. Falmouth.—Specimens one inch or less in length have the skin smooth.
i–k. Young. Polperro. Presented by J. Couch, Esq.
l–n. Very young. Sukkertoppen. From Hr. Holböll's Collection.

o–t. Very young. Greenland. From Hr. Hollböll's Collection.—Anterior dorsal fin with six distinct spines.
u, *v*. Half-grown and young.
w. Adult: skin. From Gronow's Collection.
x. Half-grown: anatomical preparation. Scotland.
y. Adult: skeleton. Baltic. From Dr. A. Günther's Collection.

The œsophagus is wide, and separated from the stomach only by a slight external contraction, the folds of its mucosa passing uninterruptedly into those of the stomach; the latter is a large, horseshoe-like, bent sac, the cardiac portion of which is situated along the vertebral line, whilst the pyloric is on the ventral side. The pylorus is surrounded by two packets of about fifty appendages of moderate length, some of which are bifurcate. The remainder of the intestinal tractus makes several irregular circumvolutions, and is once and a half as long as the whole fish. The rectum is much wider than the small intestines, and separated from them by a prominent fold of the mucosa. The liver is undivided, triangular, of moderate size, situated on the left side of the stomach. I am unable to detect a gall-bladder*.

The form of the kidney is subject to some variation: in a Scotch male specimen both halves are symmetrical, their upper ends are thick, and they commence in a deep impression of the diaphragma. They are separated from each other by a thick mass of the muscles of the vertebral column, becoming thinner posteriorly, and are united into one slender cord in the middle of the length of the abdomen. They terminate in a single ureter, before reaching the extremity of the abdomen.

In a male specimen from the Baltic, examined by myself in Berlin, I found the kidney not symmetrical, the left upper portion having been entirely separated from the remainder of the organ. The right and left upper portions were obtusely pointed superiorly, the extremities being imbedded in a capsule formed by the diaphragma.

The urine-bladder is rather large; the testicles are entirely separated. The external openings of the intestines and urogenital organs are very close together, in a fold of the skin.

Skeleton.—The bones of *Cyclopterus* are distinguished by the small quantity of calcareous salts deposited in them: the latter form thin lamellæ in each of the bones, and the interspaces between these layers are filled with a soft gelatinous substance which is soon dried up, so that the bones of the skull shrink together to a shapeless mass†. In a fish with the bones so incompletely ossified and semimembranaceous, it is often impossible to find the sutures between them. The crown of the head is broad, and the interorbital space of scarcely less width. The orbital edge of the frontal bones is prominent, forming a roof above the orbit; it is completed by the prefrontal, which emits a flat horizontal process joining the principal frontal. The anterior portion of the infraorbital ring is well developed, and appears to be membranaceous posteriorly. The maxillary is not dilated; the intermaxillary has the posterior processes of moderate length. The humerus is long, and composed of two broad lamellæ; the pectoral rays are joined to a long series of six carpal bones, the series extending nearly to the lower end of the humerus. Each pubic bone has three processes: an anterior very broad one, for the attachment to the humerus; a second anterior slender one, for a symphysis with its fellow; and an upper one, of triangular shape, for the attachment of the ventral muscles. Each pubic bone is concave inferiorly, and the ventral spine and rays are fastened on the margin of the concavity, each emitting a process inwards.

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* Stannius (*Vergl. Anat. Fische*, p. 203) describes the gall-bladder as small and roundish, and accuses Prof. Owen, who has denied its presence, of an error. The specimen which I have examined is from the Scotch coast; that examined by Prof. Owen is probably British also. It may be that individuals of the same species of fishes vary in this respect.

† These skeletons, therefore, should be preserved in spirits.

There are thirteen abdominal and fifteen caudal *vertebræ*, the length of the former portion of the vertebral column being to that of the latter as 1 : 1·4. The hæmal, neural, interhæmal and interneural spines are of moderate length. The last vertebræ are considerably shortened; only the last abdominal and the first caudal vertebræ have short and feeble ribs attached to their neural spines.

2. **Cyclopterus spinosus.**

Cyclopterus spinosus, *Müll. Prodr.* p. ix; *Fabr. Faun. Grönl.* p. 134, and *in Naturh. Selsk. Skr. Kjöbenh.* iv. p. 27. tab. 9. fig. 2; *Bl. Schn.* p. 198. tab. 46; *Cuv. Règne Anim.*; *Faber, Fische Isl.* p. 53; *Kröyer, Naturh. Tidskr.* ii. 1847, p. 262; *Gaim. Voy. Scand. Poiss.* pl. 4. fig. 2.

D. 6–7 | 11–12. A. 10–11.

The anterior dorsal fin very distinct, not enveloped in thick skin. Gill-opening reduced to a narrow foramen, situated on the level of the eye. Head and body covered with large conical plates, each with a spine in the centre.

Coasts of Greenland, Iceland, and Spitzbergen.

a. Fine specimen. Greenland.

The head and body form one suborbicular, slightly compressed mass, highest below the anterior dorsal fin, and terminating in a short and narrow tail. The plates with which the skin is covered are studded with small tubercles, roundish, and conically elevated in the centre. The cleft of the mouth is of moderate width, extending backwards to the vertical from the margin of the orbit. Both jaws are armed with a narrow band of minute teeth. The eye is situated immediately below the upper profile, one-fourth of the length of the head, and less than one-half of the width of the interorbital space. The origin of the anterior dorsal fin is in the vertical from the gill-opening, and the interspace beween the two dorsal fins is equal to the length of the anterior. A series of large plates runs along the upper orbital edge to the side of the back; two other series, formed by smaller plates anteriorly and by larger ones posteriorly, run along the middle of the interorbital space and along the base of the dorsal fins. Other large plates occupy the side of the trunk; the plates below the eye and on the cheek are only one-fourth the size of those on the body, and those on the tail are small.

Length of the specimen 6 inches.

3. **Cyclopterus orbis.**

D. 7 | 9. A. 9.

The anterior dorsal fin is very distinct, and not enveloped in thick skin. Gill-opening reduced to a narrow foramen, situated on the level of the eye. Head and body covered with large, conical, tubercular plates.

Esquimault Harbour (west coast of North America).

a. Presented by Lord John Russell.

This species is very similar to *C. spinosus*, from which it chiefly differs in the number of the fin-rays. The head and body form one orbicular mass, terminating posteriorly in the narrow and short tail. The plates with which the skin is covered are very rough, tubercular, conically elevated in the centre. A series of large plates runs along the upper orbital edge to the side of the back; two series of smaller ones run along the middle of the interorbital space and along the base of the dorsal fins. Other large plates occupy the middle of the sides and the lateral part of the belly; the plates on the side of the head, before the pectoral, are only half as large as those described, and those on the tail are small. The mouth is transverse, not extending on to the side of the head. The eye is about one-third of the length of the head, and one-half the greatest width of the interorbital space. The ventral disk is shorter than the head, subcircular, entire, and surrounded by fifteen flat papillæ. The caudal fin is of moderate length, rounded, and composed of nine simple rays. Vent nearer to the ventral disk than to the anal fin.

This description is taken from a single, apparently young specimen, 22 lines in length.

Second Group. LIPARIDINA.

Only one genus.

2. LIPARIS.

Liparis, *Artedi, Syn.* p. 117; *Cuv. Règne Anim.*

Body subcylindrical anteriorly, compressed posteriorly, rather elongate, enveloped in a more or less loose naked skin. Head broad, obtuse; snout rather short. The infraorbital bone styliform posteriorly, extending backwards to the margin of the præoperculum*.

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* This was first observed by Pallas, who says of *Liparis callyodon*, "A maxilla superiore utrinque processus sub cute tenuis, osseus, quasi zygoma, per discum operculorum."

One dorsal fin, with the rays feeble, flexible, the anterior ones being unarticulated. Ventral fins composed of one spine and five rays, all united into a more or less circular disk. A villiform band of teeth in the jaws, palate smooth. Three gills and a half; pseudobranchiæ none or rudimentary; branchiostegals six (five). Gill-opening narrow, the gill-membranes being united below the throat and firmly attached to the isthmus. Skeleton rather firm. Number of the pyloric appendages increased.

Northern seas of both hemispheres; extending southwards to the coasts of Belgium, England, and California.

1. Liparis vulgaris.

Sea Snail, *Willughby*; *Petiver, Gazoph.* tab. 51. fig. 5.
Liparis nostras, *Willughby, App.* p. 17. tab. H. 6. fig. 1; *Ray*, p. 74.
Cyclopterus liparis, *L. Syst. Nat.* i. p. 414; ? *Bl.* taf. 123. figs. 3, 4; *Lacép.* ii. p. 69.
Gobio, sp., *Kölreuter, Nov. Comm. Petrop.* ix. p. 439. tab. 9. figs. 5 & 6.
Cyclogaster, sp., *Gronov. Zoophyl.* n. 198; *Act. Helvet.* iv. p. 265. n. 165. tab. 13.
Gobioides smyrnensis, *Lacép.* ii. p. 579.
Liparis, sp., *Bl. Schn.* p. 569.
Unctuous Lump-sucker, *Penn. Brit. Zool.* iii. p. 135. pl. 21. figs. 2, 4; *Donov. Brit. Fishes*, ii. pl. 47.
Liparis vulgaris, *Flem. Brit. Anim.* p. 190; *Yarr. Brit. Fishes*, 2nd edit. ii. p. 371, 3rd edit. ii. p. 349; *Parn. Wern. Mem.* vii. p. 383, and *Fishes Frith of Forth*, p. 223.
—— barbatus, *Ekstr. Vet. Akad. Handl.* 1832, p. 168. tab. 5, and *Fische Scheer. Mörkö*, p. 112. tab. 5; *Nilss. Skand. Faun. Fisk.* p. 237.
Cyclogaster liparis, *Gronov. Syst. ed. Gray*, p. 40.

Variety.

Cyclopterus lineatus, *Lepechin in Nov. Comm. Petrop.* xviii. p. 522. tab. 5. figs. 2, 3; *Bl. Schn.* p. 198.
—— musculus, *Lacép.* iv. p. 683.
Liparis lineatus, *Kröyer, Naturh. Tidskr.* ii. 1847, p. 284; *Gaim. Voy. Scand. Poiss.* pl. 13. fig. 2.

B. 6. D. 35–36. A. 27–28. C. 10. Cæc. pyl. 16. Vert. 12/30.

Vertical fins contiguous; the anal commences in the vertical from the seventh dorsal ray; pectoral margin with a notch, the lower rays being produced; ventral disk rather longer than broad, half as long as the head.

a. Adult.
b. Adult: skin.

This species is not rare on the coasts of Northern Europe; it would appear, from the accounts of Kölreuter, that it occurs also in the Mediterranean (Smyrna). This, however, is very doubtful, none of the later authors having confirmed this observation. It extends very far northwards, to 70° N. lat., to Spitzbergen and the shores of the White Sea.

The body is thick and subcylindrical anteriorly, compressed posteriorly, enveloped in an unctuous, thin, loose skin; its greatest depth, on the middle of the abdomen, is about one-fifth of the total length. The head is obtuse, with the nape of the neck slightly swollen; its length is one-fourth of the total. The snout is broad, not depressed, and of moderate longitudinal extent. The cleft of the mouth is horizontal, not extending to the vertical from the anterior margin of the eye, with rather thick lips and with the upper jaw rather longer than the lower. Both jaws are armed with a band of villiform teeth, which become somewhat card-like in very large individuals. Tongue very broad, thick, obtuse. The eye is lateral, but interfering with the upper profile of the head; its diameter is one-seventh of the length of the head, and one-half of the extent of the snout and of the width of the interorbital space. The nostril is situated close before the eye. The gill-openings are reduced to a vertical slit, which extends downwards on the upper part of the root of the pectoral, the remainder of the gill-membranes being united with the base of the pectorals and with the isthmus. There are three gills and a half, but I cannot detect the slightest trace of pseudobranchiæ.

The pectoral fins are very broad, extending downwards and forwards under the throat; the twelve upper rays reach to the vertical from the origin of the anal, the remainder gradually becoming shorter as far as the last but six, which again are considerably produced. The six rays which constitute the base of the ventral disk may be easily distinguished; the disk is surrounded by about thirteen soft and flat papillæ. The dorsal fin commences above the middle of the pectoral and is slightly connected with the caudal; it is highest on its middle, where the rays commence to be articulated. The caudal is of moderate length and rounded; its rays are simple and articulated. The anal commences below the seventh dorsal ray and is contiguous with the caudal. The vent is situated in the middle between anal fin and ventral disk.

The coloration of this species is subject to great variations. Some specimens are pale yellowish-brown, mottled and spotted with dark brown. Others are reddish-grey, with broad, irregular black spots; fins reddish, with black dots arranged in transverse bands. Others, again, are brownish, with irregular darker longitudinal streaks on the head and body.

The specimen described and figured by Ekström appears to differ in several respects. He gives the numbers of the fin-rays as—D. 32, A. 32, C. 9. The nostril is said to be prolonged into two short tubes, and *to be situated midway between the eye and the upper lip.* Nilsson does not say anything about the nostril. Kröyer describes a variety with blue longitudinal streaks on the head and body—D. 34, A. 31.

The species attains to a size of more than 5 inches.

The stomach is a large cavity, with the cardiac and pyloric openings close together; it was filled with shrimps. The form of the kidneys is the same as in *Cyclopterus lumpus*: anteriorly separated by the muscles of the vertebral column, they are united in the middle of the abdomen into a narrow cord, which again becomes thicker posteriorly, terminating in the single ureter at the extremity of the abdomen. The ureter is bent upwards, and widens into a urine-bladder of moderate size.

2. Liparis fabricii.

Cyclopterus liparis, *Fabr. Faun. Grönl.* p. 135.
? Liparis communis, *Sabine, App. Parry's First Voy.* p. 212; *Richards. Faun. Bor. Amer. Fishes*, p. 263.
? Liparis, *Reinh. in Vidensk. Selsk. Naturv. Skr.* vii. p. 116. n. 41.
? Liparis tunicata, *Reinh. in Vidensk. Selsk. Naturv. Afh.* 1835 & 1842.
Liparis fabricii, *Kröyer, Naturh. Tidskr.* ii. 1847, p. 274; *Gaim. Voy. Scand. Poiss.* pl. 13. fig. 2.

B. 5. D. 42. A. 33–35. C. 12.

Vertical fins contiguous; the anal commences in the vertical from the tenth dorsal ray; pectoral margin with a notch, the lower rays being produced; ventral disk rather longer than broad, half as long as the head.

Coasts of Greenland and Spitzbergen.

a–b. Fort Leopold. From the Haslar Collection.
c. Greenland. From Hr. Holböll's Collection.
d–e. Sukkertoppen. From Hr. Holböll's Collection.
f–g. Baffin's Bay. Presented by Captain E. Sabine.
h. Not good state.

This species is closely allied to *Liparis vulgaris*, from which it differs in the following points, besides those mentioned:—

The width of the orbit is nearly one-third of that of the interorbital space and of the extent of the snout. Nostril terminating in a short wide tube, which is rather nearer to the orbit than to the upper lip. The pseudobranchiæ are present, but reduced to two very small lamellæ. Dirty yellowish, irregularly mottled with brownish, more distinctly on the fins than on the body.

The largest of the specimens from which these notes are taken is 46 lines long.

3. Liparis montagui.

Cyclopterus montagui, *Donov. Brit. Fishes*, iii. pl. 68; *Mont. in Wern. Mem.* i. p. 91. pl. 5. fig. 1; *Penn. Brit. Zool.* (ed. 1812) iii. p. 183.
Gobius, *Zool. Dan.* iv. p. 16. tab. 134.
Liparis montagui, *Cuv. Règne Anim.*; *Yarr. Brit. Fishes*, 2nd edit. ii. p. 374, 3rd edit. ii. p. 352; *Gaim. Voy. Scand. Poiss.* pl. 13. fig. 1; *Nilss. Skand. Faun. Fisk.* p. 239.
—— gobius, *Schagerstr. Vet. Akad. Handl.* 1838, p. 248.
Cyclopterus montacuti, *Turt. Brit. Faun.* p. 115.
—— liparoides, *Nilss. Prodr.* p. 62.

B. 6. D. 26–30. A. 24. C. 14. Vert. 10/25.

Vertical fins not contiguous; the anal commences in the vertical from the seventh dorsal ray; pectoral margin slightly notched, the lower rays being somewhat produced; ventral disk circular, not quite half so long as the head.

a–c. Adult. Falmouth. Presented by W. C. Cocks, Esq.

d. Adult. Salcombe Bay (Devonshire). Museum Leach.
e. Adult. Mount Edgecombe (Devonshire). Museum Leach.
f–h. Adult and half-grown: not good state. Polperro. Presented by J. Couch, Esq.
i, *k–l*. Adult. English coast.

Head broad, trunk thick, tail compressed: all enveloped in an unctuous, thin, loose skin. The greatest depth of the body, on the middle of the abdomen, is about one-fifth of the total length, the length of the head one-fourth. The head is rather flat superiorly, the nape of the neck being but slightly prominent; the snout is very broad, not depressed, and of moderate longitudinal extent; the cleft of the mouth is horizontal, not extending to the vertical from the anterior margin of the eye, with rather thick lips and with the upper jaw somewhat longer than the lower. Both jaws are armed with a broad band of villiform teeth. Tongue very broad, thick, obtuse. The eye is small, lateral, but interfering with the upper profile of the head; its diameter is one-ninth of the length of the head, and less than one-half of the length of the snout or of the width of the interorbital space. The nostril is situated nearer to the eye than to the upper lip. The gill-openings are reduced to a vertical slit, which extends downwards on the upper part of the root of the pectoral, the remainder of the gill-membranes being united with the base of the pectorals and with the isthmus. Three gills and a half; pseudobranchiæ none.

The pectoral fins are very broad, extending downwards and forwards under the throat; their extremity does not reach to the vertical from the anal fin. The six lower rays are somewhat longer than the next preceding ones, producing a slight notch in the margin of the fin. The six rays which constitute the base of the ventral disk may be easily distinguished; the disk is surrounded by thirteen soft and flat papillæ, which may be compared to the sole of the foot of the higher animals. The dorsal fin commences above the middle of the pectoral; it is low anteriorly, gradually becoming higher towards the caudal fin, from which it is separated by a short interspace. Caudal of moderate length, truncated. The anal fin commences below the seventh dorsal ray, and is lower than the dorsal; its last ray is fastened to the back of the tail by a membrane.

The colour is yellowish, the vertical fins being somewhat brighter, with a blackish shade towards the margins.

This species attains to a size of 3 inches.

4. Liparis callyodon.

Cyclopterus callyodon, *Pall. Zoogr. Rosso-Asiat.* iii. p. 75.

B. 6. D. 33. A. 24. C. 15.

Dorsal and anal fins continued nearly to the base of the caudal.
Coast of Kamtschatka.

Pallas gives the following particulars of this species:—

The teeth have three distinct lobes; a slender bone from the eye to the præoperculum. Gill-openings reduced to a lunate foramen on each side of the back. Ventral disk small. The dorsal commences a little behind the gill-opening. Brown-dotted; a silvery streak from the upper jaw through the eye and opercles.

5. **Liparis cyclopus.**

D. 35. A. 30. C. 12.

Caudal fin entirely free from dorsal and anal; the latter commences in the vertical from the seventh dorsal ray; pectoral margin with a notch, some of the lower rays being produced; ventral disk ovate, its length being less than one-half of that of the head.

a. Fine specimen. Esquimault Harbour. Presented by Lord John Russell.

This species agrees in nearly every respect with *Liparis vulgaris*, from which it differs in the following points besides those mentioned:—

The greatest depth of the body is nearly one-sixth of the total, the length of the head nearly one-fifth. The skin is tougher and more firmly adherent to the body. The head is flat above, the nape of the neck being scarcely prominent. The nostril is a short tube, situated nearly midway between the eye and the upper lip. The pectoral extends only to the vertical from the anal papilla, and the dorsal fin commences yet more backwards. The teeth are small, with three lobes. Infraorbital extending to the præoperculum.

The colour is brownish-olive, with darker spots, more conspicuous on the fins than on the body. Belly reddish.

The length of the specimen described is 45 lines.

The following species require further examination:—

6. **Liparis gelatinosus.**

Cyclopterus gelatinosus, *Pall. Spicil.* vii. p. 19. tab. 3; *Bl. Schn.* p. 199.
Liparis gelatinosus, *Cuv. Règne Anim.*

B. 7? D. plus quam 50. A. ca 45. C. 6. Cæc. pylor. 48.
Vert. 64.

Vertical fins contiguous. Ventral disk small, supported by a bilamellated cartilage, which descends from the throat.

Pallas has given a description and figure from the MS. of Steller and from a specimen in the St. Petersburg Museum:—

Body oblong, compressed, thicker towards the head and thinner towards the tail, semitransparent, exceedingly soft, like jelly. Head thick, somewhat depressed, flat on the vertex, and convex between the orbits. Eyes directed upwards; nostrils in the middle between the margin of the mouth and the orbit, with a small tubular appendage; a series of pores along the upper lip towards the gill-opening.

Lips thick; cleft of the mouth directed upwards, as in *Uranoscopus*, but with the lower jaw less prominent. The jaws, the palate, and the pharynx are rough with teeth. Four gills on each side; seven branchiostegals. The gill-opening is reduced to a slit above the base of the pectorals. Pectorals large, very broad, commencing at the throat, the inferior part of their bases being parallel, ascending to the gill-opening; they are composed of about thirty rays, the inferior of which are very short and not connected by a membrane. The dorsal and anal fins are contiguous with the caudal; they commence a little behind the middle of the body and are composed of feeble rays. The jugular disk is situated between the pectorals, in front of the vent; it is very small, soft, supported by a bilamellated cartilage which descends from the throat. The vent is between the pectorals. Caudal small, six-rayed. Rose-coloured; the vertical fins violet; gill-cavity black.

Steller adds the following anatomical details:—

Ovarium orbicular, containing eggs of the size of a pea. Liver large, divided into four lobes, of a whitish colour; gall-bladder absent. Spleen triangular, brown. The stomach is three times as wide as the œsophagus; forty-eight pyloric appendages, two inches long, and as thick as the wing-feather of a pigeon, in a specimen eighteen inches long. The remainder of the intestinal tract is about as long as the fish. The urine-bladder is the size of a hazel-nut. The kidneys are united into one cuneiform mass, commencing near the gills and extending to the anterior portion of the ovarium; the ureter is single, very wide, flexuous, becoming narrower before its insertion in the bladder. The *nervi optici* and *olfactorii* have one common ganglion, from which, first, the former arise, emitting the latter from the angle formed by the nerves and the ganglion (?). Skeleton very slightly osseous.

Specimens (one of 18 inches long) were found by Steller in Peter and Paul's Harbour.

7. Liparis pulchellus.

Liparis pulchellus, *Ayres in Proc. Calif. Acad. Nat. Sc.* i. 1855, p. 23.
Cyclogaster pulchellus, *Girard in U. S. Pacif. R. R. Exped. Fishes*, p. 132.

We are unable to give the specific differences of this fish, as it is only known to us by the description of Girard, who omits the numbers of the fin-rays, stating, however, that the vertical fins are united. The following is an abstract of Girard's notes, taken from a specimen four inches long:—

The head is contained about five times in the total length; the snout protrudes slightly beyond the upper jaw. The longitudinal diameter of the eye enters about five times in the length of the head. The mouth is not deeply cleft, since the maxillary extends but to a vertical line drawn in advance of the pupil. The lips are flabby. Teeth very small, disposed in transversely oblique series in each jaw. Girard has found only four branchiostegals. Dorsal and anal fins united to the caudal; the former commences somewhat behind the base of the pectoral. The origin of the anal is nearer the extremity of the snout than that of the caudal fin. Ventral disk elliptical. The pectorals are large, the lateral portion being quite elongate, composed of more slender and crowded rays than the inferior portion; the external outline of these fins is falciform. The vent is situated midway between ventral disk and anal fin. Skin flabby. Numerous large mucous pores may be seen on the head, and constituting a lateral line on the anterior region of the body.

Light olive-brown, with numerous waving longitudinal lines of darker brown; some small brown and white spots on the sides.

San Francisco.

8. **Liparis mucosus.**

Liparis mucosus, *Ayres, Proc. Calif. Acad. Nat. Sc.* i. 1855, p. 24.

Not having seen the Journal quoted, I am unable to say anything about this fish. Girard appears to be somewhat doubtful as to its specific distinctness from *L. pulchellus*.

Fam. 21. OXUDERCIDÆ.

Head and body elongate, covered with small scales. Dorsal and anal fins long, both with six spines, the soft portion being the more developed. Ventral fins none.

Only one genus.

1. **OXUDERCES.**

Oxuderces, *Valenc. in Voy. Bonite, Poiss.* p. 181.

Head and body elongate, subcylindrical, covered with small scales. Cleft of the mouth wide, anteriorly with canines in the upper jaw; teeth in the lower jaw in a single series, horizontal. Eyes of moderate size, prominent. One long dorsal, with six spinous rays; anal with six spines. Caudal quite free; ventrals none. Gill-membranes united below the throat, and not adherent to the isthmus.

China.

1. **Oxuderces dentatus.**

Valenc. l. c. p. 182. pl. 8. fig. 3.

$$D. \frac{6}{24}. \quad A. \frac{6}{21}.$$

Eyes very close together; the cleft of the mouth extends to behind the eyes.

Macao.

Fam. 22. BATRACHIDÆ.

Pediculati, pt., *Cuv. Règne Anim.*

Habitus cottoid; skin naked or with small scales; the system of muciferous channels well developed. Teeth conical, small or of moderate size. *The spinous dorsal very short, the soft and the anal long. Ventrals jugular, with two soft rays*; pectorals not pediculated. Gill-opening a more or less vertical slit before the pectoral, rather narrow. Gills three; pseudobranchiæ absent; an air-bladder.

Carnivorous fishes, living on the bottom of the coasts of the tropical regions, several species advancing into the temperate seas.

Synopsis of the Genera.

Dorsal spines three	1. BATRACHUS.
Dorsal spines two; canine teeth none	2. THALASSOPHRYNE.
Dorsal spines two; canine teeth on the vomer	3. PORICHTHYS.

1. BATRACHUS*.

Batrachus, sp., *Bl. Schn.* p. 42; *Cuv. & Val.* xii. p. 461.

Head broad, depressed; body subcylindrical anteriorly and compressed posteriorly; skin naked, or covered with very small scales. Canine teeth none. Gill-covers with several spines. The spinous dorsal formed by three stout spines. Gill-opening narrow, not extending to the side of the isthmus. Gills three, pseudobranchiæ none, branchiostegals six; air-bladder more or less deeply divided into two lateral parts. Pyloric appendages none. Vertebræ $\frac{12}{17-27}$.

Coasts of nearly all the tropical and temperate regions.

The *skeleton* of the species of this genus is distinguished—

1, by the broad, depressed form of the skull, the bones being well ossified, leaving distinct sutures between them.

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* 1. Cottus, sp., *Gronov. Mus. Ichth.* i. p. 46. no. 106, and *Zoophyl.* p. 79. no. 269.—Batrachus gronovii, *Cuv. & Val.* xii. p. 482.—Callionymus niqui, *Gron. Syst. ed. Gray*, p. 45 (not synon.).—Tropical parts of the Atlantic.—The typical specimen is not preserved in Gronow's Collection.

2. Batrachoides variegata, pt., *Lesueur, Journ. Acad. Nat. Sc. Philad.* iii. 1823, p. 398.—Batrachus variegatus, *Cuv. & Val.* xii. p. 484.—North America.

3. Pacamo, *Marcgr.* p. 148.—Batrachus cryptocentrus, *Cuv. & Val.* xii. p. 485.—Bahia.

4. Batrachus apiatus, *Cuv. & Val.* xii. p. 477; *Cuv. Règne Anim. Ill. Poiss.* pl. 85. fig. 3.—Cape Seas.

Callionymus trigloides, *Forst. Descr. Anim. ed. Licht.* p. 358 (Batrachus trigloides, *Bl. Schn.* p. 44), from Terra del Fuego, is probably a species of *Notothenia* or *Aphritis*. A rough sketch of the fish is preserved in the British Museum, but does not quite agree with the description.

Batrachus bispinis, (*Bl. Schn.*) *Cuv. & Val.* xii. p. 484, is the fish described as Harpagifer bispinis: cfr. vol. ii. p. 263.

2, by a large epitympanic bone (os temporale).

3, by a great number of caudal vertebræ, all the single vertebræ being short, stout, firmly joined to one another.

4, by the ribs of the first vertebra, which are strong, elongate, and joined to the upper extremity of the humerus.

5, by a very short radius and ulna, and elongated carpal bones.

Batrachus tau with	12+22	vertebræ.
———— *trispinosus* with	12+17	"
———— *didactylus* with	12+17	"
———— *surinamensis* with ..	12+27	"
Porichthys porosissimus with....	11+31	"

* Species without scales.

1. Batrachus tau.

Gadus tau, *L. Syst.* i. p. 440.
Lophius bufo, *Mitch. Lit. & Phil. Trans. New York*, i. p. 463.
Batrachoides vernullas, *Lesueur, Mém. Mus.* v. p. 157. pl. 17.
Batrachus variegatus, *Storer, Rep. Massach.* p. 74.
—— tau, *Cuv. & Val.* xii. p. 478; *Dekay, New York Fauna, Fishes*, p. 168. pl. 28. fig. 86.
—— celatus, *Dekay, l. c.* p. 170. pl. 50. fig. 161 (young).

D. 3 | 26–28. A. 21–22. V. 1/2. Vert. 12/22.

The length of the head is contained three times and a half in the total; the width of the bony bridge between the orbits is more than that of the orbit. Snout broad, flat, depressed, about twice as long as the eye. Gill-covers with three spines directed backwards, two belonging to the operculum and one to the suboperculum. Vomer and palatine bones with a single series of obtusely conical teeth; similar teeth in the lower jaw, in two series anteriorly and in a single one laterally. Snout surrounded by a wreath of fleshy tentacles; those above the orbit well developed. The maxillary extends to behind the vertical from the posterior margin of the eye. A round foramen in the middle of the axil, or somewhat above it.

Atlantic coasts of North and Central America.

a. Northern variety.

Brown, coarsely marbled with darker; dorsal with nine, anal with five oblique dark-brown bands, caudal with four cross-bands; pectoral rather irregularly brown-spotted.

a. Adult. New York. Purchased of Mr. Brandt.
b, c–d. Adult and half-grown. North America.
e. Adult skeleton: female. New York. Purchased of Mr. Brandt.
f. Preparation of the internal parts of specimen *e*.

β. Southern variety.

Brown, marbled with darker and dotted with whitish; dorsal and anal fins each with about nine narrow oblique brown bands, more or less confluent, and having whitish spots between them. Caudal and pectoral with many round white spots, arranged in transverse series.

g. Fine specimen. New Orleans. Purchased of Mr. Cuming.
h. Adult. From the Haslar Collection.

Air-bladder cardiform, with the notch anteriorly.

Skeleton.—Valenciennes's description of the skull of *B. surinamensis* agrees very well with that of the present species. The skeleton differs from that of *B. didactylus* in the following points:—

The crown of the head is not much broader than long, and divided into two parts by a very distinct longitudinal crest, rectangular to the transverse ridge of the transverse muciferous channel. The latter is divided into two portions, each portion being continuous with an interorbital channel. The interorbital space is so narrow as to be entirely occupied by the channels and their ridges. There is a præorbital present; it is narrow, styliform, flexible, situated behind and below the maxillary. The base of the cranium is very convex. Five carpal bones distinctly developed. The vertebral column is composed of twelve abdominal and twenty-two caudal vertebræ, the length of the former portion being to that of the caudal as 1 : 1·7. All the vertebræ are very short.

2. Batrachus grunniens.

Knorhaen, *Nieuh. Zee- en Lantreize,* p. 271 cum fig., cop. by *Willughby, App.* pl. 4. fig. 1.
Cottus grunniens, var. B., *L. Mus. Ad. Fried.* ii. p. 65; *L. Gm.* i. p. 1209.
Cottus grunniens, *Bloch,* taf. 179; *Lacép.* iii. p. 232; *Shaw, Zool.* iv. p. 256.
Batrachus grunniens, *Bl. Schn.* p. 43; *Bleek. Riouw,* p. 487.
Batrachoides gangene, *Buch. Ham. Fish. Gang.* p. 34. pl. 14. fig. 8.

D. 3 | 20. A. 16–18. V. 1/2.

The length of the head is contained three times and a half in the total; the width of the bony bridge between the orbits is five times and a half in the length of the head, and equals the diameter of the eye, which is shorter than the snout. Gill-covers with four spines directed backwards, two belonging to the operculum and two to the suboperculum. Vomer and palatine bones with a single series of short conical teeth. Snout broad, depressed, flat, surrounded by a wreath of short tentacles; tentacles above the orbit short, sometimes entirely absent. The maxillary extends to below the posterior margin of the orbit. No foramen in the axil. Head, body, and vertical fins brown, irregularly marbled with darker; pectorals brown-dotted, the dots confluent into rather irregular cross-streaks.

East Indian Seas.

a. Adult. Amboyna. Purchased of Mr. Stevens.
b. Adult. Ganges. Presented by G. R. Waterhouse, Esq.—Type of *Batrachoïdes gangene*, Buch. Ham.

c, d. Adult and half-grown. East Indies.
e. Young. Presented by Captain Sir E. Belcher, C.B.

Bloch distinctly describes and figures his *Cottus grunniens* with four spines on the gill-covers; therefore the species with three spines, to which Valenciennes gives this denomination, cannot be the same.

3. Batrachus trispinosus.

Seba, iii. 28. 4.
Batrachus grunniens, *Cuv. & Val.* xii. p. 466; *Cant. Catal.* p. 205; (not *Bl.*).

D. 3 | 22. A. 18. V. 1/2. Vert. 12/17.

The length of the head is contained three times and a half in the total; the width of the bony bridge between the orbits is five times and a half in the length of the head, and equals the diameter of the eye, which is shorter than the snout. Gill-covers with three spines directed backwards, two belonging to the operculum and one to the suboperculum. Vomer and palatine bones with a single series of short conical teeth. Snout broad, depressed, flat, surrounded by a wreath of short tentacles; tentacles above the orbit very distinct. The maxillary extends to below the posterior margin of the orbit. A round foramen in the upper part of the axil. Greenish- or brownish-olive, marbled with darker, the dark spots being dotted and edged with black; caudal, pectorals and ventrals with blackish spots or narrow vertical bands.

Seas of Bombay, Singapore, and Pinang.

a. Adult: skin. Sea of Pinang. From Dr. Cantor's Collection.
b. Half-grown. Singapore.

Air-bladder separated into two lateral divisions, united by a narrow transverse channel.

4. Batrachus dussumieri.

Cuv. & Val. xii. p. 474. pl. 367.

D. 3 | 20. A. 16. V. 1/2.

The length of the head is contained three times and a half in the total. Gill-covers with three spines directed backwards, two belonging to the operculum and one to the suboperculum. The lower jaw and the palate with narrow bands of villiform teeth. Snout broad, depressed, flat, surrounded by a wreath of very short tentacles; tentacle above the orbit very small. Brown, with three rather indistinct darker cross-bands; fins immaculate. (*Val.*)

Coast of Malabar.

Air-bladder similar to that in *B. trispinosus.*

5. Batrachus dubius.

White, Voy. New South Wales, p. 265; *Richards. Voy. Ereb. & Terr. Fishes*, p. 16. pl. 10.

D. 3 | 18. A. 15. V. 1/2.

The length of the head is contained three times and a half in the total; the width of the bony bridge between the orbits is one-seventh of the length of the head, and equals the diameter of the eye, which is shorter than the snout. Gill-covers with three spines directed backwards, two belonging to the operculum and one to the suboperculum. Vomer and palatine bones with a single series of short conical teeth. Snout broad, depressed, flat, surrounded by a wreath of short tentacles; tentacles above the orbit very distinct. The maxillary extends to below the posterior margin of the orbit. A round foramen in the upper part of the axil. Brown, marbled with darker; some small, round, deep-black spots on the side of the body; dorsal with oblique brown bands, pectoral with many round white spots.

Australia.

a, b. Adult. From the Haslar Collection.

6. Batrachus diemensis.

Batrachoides diemensis, *Lesueur, Journ. Acad. Nat. Sc. Philad.* iii. 1823, p. 402.
Batrachus quadrispinis, *Cuv. & Val.* xii. p. 487.
—— diemensis, *Richards. Ann. Nat. Hist.* x. p. 352, and *Voy. Ereb. & Terr. Fishes*, p. 17. pl. 8. figs. 1, 2; *Bleek. Timor*, p. 168.

D. 3 | 20. A. 15–17. V. 1/2.

The length of the head is contained three times and three-fourths in the total; the bony bridge between the orbits is narrow, its width being one-eighth of the length of the head, and much less than that of the orbit, which equals the length of the snout. Gill-covers with four spines, two of which belong to the operculum and two to the suboperculum; one of the latter, however, becomes nearly obsolete with age, and is always very small. Jaws, vomer, and palatine bones with a band of villiform teeth. Snout short, obtuse, with its upper profile parabolic; it is surrounded by a wreath of tentacles; those above the orbits well developed, ciliated. The maxillary extends to below the middle of the orbit. No foramen in the axil. The outer ventral ray is much longer than the inner one, tapering, nearly as long as the head. Brown, marbled with darker.

Coasts of Australia, Timor, Ceram, and Banka.

a. Adult. Australia. From Mr. Macgillivray's Collection.
b. Half-grown. Australia. Presented by Sir J. Richardson.
c. Adult: skin. Port Essington.

** Scaly species.

7. Batrachus didactylus.

? Sea-toad, *Barbot, Coll. Voy.* v. p. 223. pl. 18.
Gadus tau, *Bl. Fische Deutschl.* ii. p. 170. pl. 67. figs. 2 & 3.
Batrachus didactylus, *Bl. Schn.* p. 42.
—— tau, *Bl. Schn.* p. 44.
—— borealis, *Nilss. Prodr.* p. 99, and *Skand. Faun.* iv. p. 254.

Batrachus punctatus, (*Cuv.*) *Spix, Pisc. Bras.* p. 133. pl. 74.
—— conspicillum, *Cuv. & Val.* xii. p. 495.
—— punctulatus, *Cuv. & Val.* xii. p. 497.
—— barbatus, *Cuv. & Val.* xii. p. 498.
—— planifrons, *Guich. Explor. Sc. Algér. Poiss.* p. 81.
—— algeriensis, *Guich. l. c.* pl. 5.

D. 3 | 20–21. A. 16–17. V. 1/2. Vert. 12/17.

Scaly. The length of the head is two-sevenths of the total. Eye very small. Gill-covers with three spines directed backwards, one from the suboperculum, the two others from the operculum. No fold of the skin below the eye. A series of pointed conical teeth on the vomer, the palatine bones, and on the sides of the mandibula; the upper jaw and the front part of the lower with a band of cardiform teeth. Snout very broad, obtuse, flat and depressed, surrounded by tentacles of variable length, those of the mandibula being much larger than those of the maxillary; no tentacle above the eye. Cleft of the mouth very wide. A foramen superiorly in the axil. Brownish, lighter on the sides, dotted and spotted all over with brown, the dots generally separated from one another by whitish lines; sometimes a greyish band between the eyes, and a pair of more or less distinct round spots of the same colour on the nape. Spots on the vertical fins larger.

Atlantic, from the coast of Portugal to Guinea; (occasionally in the German Ocean.)

a. Very fine specimen: eighteen inches long. Lisbon. Presented by the Rev. R. T. Lowe.
b–c. Adult and half-grown. Lisbon. Presented by the Rev. R. T. Lowe.
d–e. Adult and half-grown. Cadiz. From the Haslar Collection.
f. Adult: stuffed. Mediterranean.
g. Adult male: skeleton. Lisbon. Presented by the Rev. R. T. Lowe.
h. Preparation of the internal parts of specimen *g*.

This fine species, mentioned by Valenciennes under three different denominations, and by another French naturalist under two others, is readily distinguished by the number of the fin-rays and the numerous spots, separated from one another by a fine net of whitish lines. It is the only European representative of the genus at present known. The statement of its occurrence on the coast of Guinea is founded on the authorities of Barbot and Schneider, and is scarcely to be doubted; but we have not so good an indication of its presence in the American parts of the Atlantic. Bloch does not say whence he procured the specimens of his *Gadus tau*; and when Schneider afterwards adds "Habitat in America," it is to be supposed that he borrowed this locality from the true Linnean *Gadus tau*, which is an American species, but quite different from that of Bloch. Agassiz says that his specimen was from the Atlantic. Both Agassiz and Guichenot have apparently coloured their figures from specimens preserved in spirits for some time.

I have examined the foramen which is found in the axil of this species, and also of several others. It leads into a closed spacious cavity, the inside of which is coated with a mucous membrane having many reticulated folds. It appears to belong to the system of muciferous channels, which is exceedingly developed in the fishes of this family.

The air-bladder is divided into two ovate lateral portions, communicating with each other by a narrow transverse tube; the internal cavity is small, compared with the considerable size of the organ; this is due to the immense development of the muscle, fixed to the side of each portion of the bladder.

The genitals of the male show the peculiarity of two accessory glandular organs being attached to the lower end of each of the *vasa deferentia*. The one is compressed, externally similar to a detached portion of the testicle; the other, situated more inferiorly, is of elliptical shape and of a blackish-brown colour.

Skeleton.—The skull is distinguished by its depressed, broad, rounded form, being similar in this respect to that of *Cottus gobio* or *Silurus glanis*. The bones are well ossified, and the sutures generally very distinct. The crown of the skull is flat, twice as broad as long, with the longitudinal crest scarcely visible, but emitting a strong process joined to the neural spine of the first vertebra. The posterior angles of the orbit are very prominent, and a transverse muciferous channel, formed by two low ridges, runs from one angle to the other. The orbital incisure is deep, sub-semicircular; the space between the orbits broad, flat; a muciferous channel runs along the orbital edge, and is bent inwards posteriorly to meet its fellow from the other side (**U**). Præfrontal small, forming the anterior angle of the orbit. The maxillary is long, slender, dilated at the extremity; the intermaxillary is much shorter, slightly dilated posteriorly, and with the posterior processes of moderate length. The mandible is low, strong, and very long, strongly bent inwards towards the symphysis; its muciferous channels are little developed. The head of the vomer is very broad, flat, anteriorly with a dentigerous ridge; palatine and pterygoid rather short and narrow. The base of the cranium broad and quite flat. The epitympanic is large, moveable, and so intercalated between the cranium, the operculum and præoperculum, that the two latter bones are rather remote from the cranium. The præoperculum is very solid, and larger than any of the other opercular bones; operculum reduced to three bony radii, one of which is directed downwards; the suboperculum is a thin subtriangular bone with a very strong ridge terminating in a spine; there are, besides, two much more feeble ridges above it. Infraorbital bones none.

The suprascapula and scapula are united into a single, long, sword-shaped bone; coracoid rib-like: the radius and ulna are very short, whilst the carpal bones are elongated; there are five of them, the lower being the largest, the upper rudimentary. A very peculiar styliform bone (a pair of transformed ribs) extends from the neural spine of the first vertebra to the upper end of the humerus; it is slighly moveable at both its extremities, and fixes the humerus at a certain horizontal distance from the vertebral column.

Each pubic bone is formed of two pieces horizontally directed inwards; the anterior is broad, triangular, the posterior styliform and tapering: the pubic bones are very loosely attached to the humerus.

There are twelve abdominal and seventeen caudal *vertebræ*, the length of the former portion of the vertebral column being to that of the caudal as 1 : 1·43. The vertebræ are stout, rather short, and, especially the anterior ones, firmly wedged into one another; their neural spines are strong, reclining backwards; the interneurals of the spinous dorsal fin are firmly united to the neurals of the third, fourth and fifth vertebræ. The interneurals of the second dorsal, the hæmals and interhæmals, and the ribs are feeble.

8. **Batrachus pacifici.**

D. 3 | 25–26. A. 21–22. V. 1/2.

Scaly. The length of the head is nearly one-fourth of the total; the diameter of the eye is more than one-half of the width of the bony bridge between the orbits, or one-ninth of the length of the head. Gill-covers with four spines directed backwards, two at the operculum and two at the suboperculum, the latter being more backwardly situated than the former. A very slight and short horizontal fold of the skin behind the eye. Teeth on the vomer, the palatines, and on the side of the lower jaw in a single series, obtusely conical; mandible anteriorly with a patch of villiform teeth, and with two pairs of strong conical teeth in the outer series. Snout very broad, obtuse, flat and depressed, surrounded by a wreath of tentacles; no tentacle above the orbit. The maxillary extends far behind the eye. Axil without foramen, but with a pocket-like excavation formed by a fold of the skin; a wide pore at the inner base of each pectoral ray. Ventral fin not quite half so long as the head. Brownish-grey, marbled with darker; some indistinct blackish bands across the back. Dorsal with about eight oblique, rather irregular blackish bands; caudal with some indistinct cross-bands; anal with black margin and with some spots posteriorly; pectoral with blackish spots; ventral blackish.

Coast of Panama.

a, b. Adult and half-grown. From Mr. Fraser's Collection.

	inches.	lines.
Total length	8	0
Length of the head	2	1
Width of the head	2	0
Diameter of the eye	0	$2\frac{3}{4}$

This species appeared to me to be the representative of *B. surina-*

mensis on the western coasts of America, until I received a specimen of the true *B. surinamensis* from the same side of that continent; it must be specifically distinguished, as it differs in the dentition of the lower jaw, in the number of the fin-rays, &c.

9. **Batrachus surinamensis.**

Batrachus surinamensis, *Bl. Schn.* p. 43. tab. 7 (bad); *Cuv. & Val.* xii. p. 488.

Batrachoides tau, *Lacép.* ii. p. 1. pl. 12. fig. 1.

D. 3 | 28–29. A. 25–26. V. 1/2. Vert. 12/27.

Sealy. The length of the head is two-sevenths or one-fourth of the total. Eye very small. Gill-covers with four spines directed backwards, two belonging to the operculum and two to the suboperculum. A horizontal fold of the skin from below the eye towards the upper portion of the præoperculum, covering a series of large pores. Teeth of the vomer and the palatines and those on the side of the mandibula obtusely conical, in a single series; the anterior teeth of the latter form a villiform patch, but there are no anterior canine-like teeth. Snout very broad, obtuse, flat and depressed, with short tentacles; no tentacle above the eye. Cleft of the mouth very wide. No foramen in the axil. Light brown, marbled with darker, and with four broad deep-brown cross-bars, one of which is on the neck. Dorsal and anal fins with oblique irregular brown streaks.

Atlantic coasts of Tropical America. Pacific coast of Central America.

a. Half-grown. West Indies.
b, c. Adult: not good state. Demerara. Presented by Sir R. Schomburgk.
d–e. Half-grown: not good state. British Guiana. Presented by Sir R. Schomburgk.
f. Half-grown. West coast of Central America. Collected by Captain Daw. Presented by Dr. P. L. Sclater, Secr. Zool. Soc.
g. Half-grown: bad state. Purchased of Mr. Bartlett.

The air-bladder is composed of two oblong lateral lobes, united posteriorly.

2. THALASSOPHRYNE*.

Head broad, depressed; body subcylindrical anteriorly and compressed posteriorly; skin naked. Canine teeth none. Operculum with a single spine. The spinous dorsal formed by two spines of moderate length. Gill-opening not very narrow, not extending to the isthmus.

Atlantic coasts of Tropical America.

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* Greek denomination for Sea-toad.

1. Thalassophryne maculosa.

D. 2 | 19. A. 18. V. 1/2.

Brown, marbled with darker; some round black spots on the pectoral and the side of the body.

a. Puerto Cabello. Purchased of Mr. Brandt.

Description of the specimen.—The general habitus is that of a *Batrachus*. The head is somewhat longer than broad, its length being contained three times and one-third in the total; it is moderately depressed. The snout is short, obtuse, with the cleft of the mouth ascending obliquely upwards, and with the chin prominent. The maxillary extends to the vertical from the posterior margin of the orbit. The teeth are obtusely conical, standing in single series, except anteriorly in the lower jaw, where they form two series, and in the upper, where they are cardiform, in a narrow band. The eyes are directed upwards and very small, their width being one-half of that of the bony bridge between the orbits. Gill-covers with a single spine; it is long, slender, cylindrical, like one of the dorsal spines, and has the operculum for its base. Gill-opening not very narrow; it extends from the upper base of the pectoral obliquely downwards and forwards to the level of the inferior base of the pectoral. The two dorsal spines are slender, pungent, about one-third of the length of the head. Dorsal and anal fins terminate immediately before the root of the caudal, the length of which is one-seventh of the total. Pectoral obliquely rounded, extending to the origin of the anal; ventral rather short, not quite one-half the length of the head, extending to the base of the pectoral. Skin perfectly smooth, with some very short tentacles on the lower jaw. Two short horizontal muciferous channels on the cheek and the lateral line are very distinct; they are not, as usually, composed of a series of distant pores, but the pores are confluent, forming one continuous groove of a white colour. Other muciferous channels, as for instance along the base of the anal, are composed of separate indistinct pores.

Colour brown, marbled with darker; pectoral fins and sides of the body with some round black spots; chin and ventrals brownish; belly white.

	lines.
Total length	54
Length of the head	16
Width of the head	14
Depth of the head	10
Diameter of the eye	1
Length of the caudal fin	8
——— of the ventral fin	7

3. PORICHTHYS.

Batrachus, sp., *Cuv. & Val.* xii. p. 500.
Porichthys, *Girard, Proc. Acad. Nat. Sc. Philad.* vii. 1854, p. 141.

Head broad, depressed; body subcylindrical anteriorly and compressed posteriorly; skin naked, with many series of very distinct pores. A canine tooth on each side of the vomer. Operculum with a single spine. The spinous dorsal formed by two very small spines. Gill-opening not narrow, extending downwards to the side of the isthmus. Gills three, pseudobranchiæ none, branchiostegals six; air-bladder more or less deeply divided into two lateral parts. Pyloric appendages none. (Vertebræ 11/31.)

Coasts of America.

1. Porichthys porosissimus.

? Niqui, *Marcgr.* iv. p. 178 (fig. very bad).
Batrachus porosissimus, *Cuv. & Val.* xii. p. 501; *Jenyns, Zool. Beagle, Fishes*, p. 99.
—— margaritatus, *Richards. Voy. Sulph. Fishes*, p. 67. pl. 38. figs. 2–4.
Porichthys notatus, *Girard in Proc. Acad. Nat. Sc. Philad.* vii. 1854, pp. 141, 151, and *in U. S. R. R. Exped. Fishes*, p. 134 (pl. 25).

D. 2 | 35–36. A. 32–33. V. 1/2. Vert. 11/31.

The length of the head is contained four times and a half to four times and one-third in the total length. Abdomen with four longitudinal series of pores between the middle of the pectoral fins; the two anterior series convergent anteriorly, forming an acute angle behind the level of the middle of the ventral fins. A triangular blackish spot below the eye; vertical fins with blackish margins; dorsal sometimes with some small spots. Each pore shining silvery.

Coasts of Brazil and Surinam; Western coasts of Tropical and Temperate America.

a. Adult. South America. Purchased of Mr. Warwick.
b. Adult. Brazil. Presented by Lord Stuart.
c. Fine specimen. Vancouver Islands. Voyage of H.M.S. Plumper.

The air-bladder is composed of two oblong lateral lobes, united posteriorly.

This is a very singular, although not isolated, instance of the occurrence of the same species of fish on both sides of the continent of America, the more so as on the Atlantic coasts it has hitherto been found only between the Tropics, whilst on the Pacific coast it extends far into the temperate region. I have had the opportunity of examining Atlantic and Pacific specimens, and cannot discover any differences between them. They are, externally, entirely identical, even to the dark spot below the eye. The occurrence of this fish in the Pacific was first noted by Jenyns, who described a specimen from Bahia Blanca; then by Sir John Richardson, who obtained a specimen in a bad state of preservation from the Gulf of Fonseca, and described it as *B. margaritatus*; and finally by Girard, who gave it a third name.

Jenyns is not quite certain as to the identity of his specimen with those from Brazil, as the description of Valenciennes seems to differ in some very unimportant points. The short porous lines below the eye are present in the Eastern specimens as well as in the Western.

and have been overlooked by Valenciennes. The presence of two teeth on each side of the vomer is accidental in individuals which are shedding their teeth. Finally, I have found thirty-two or thirty-three anal rays in all the specimens, as is stated also by Jenyns, and never twenty-seven, as alleged by Valenciennes. Sir J. Richardson's specimen was in a bad state of preservation, and appears to be lost.

2. **Porichthys porosus.**

Batrachus porosus, *Cuv. & Val.* xii. p. 506. pl. 368; *Gay, Hist. Chile, Zool.* ii. p. 296.

D. 2 | 34. A. 33. V. 1/2.

The length of the head is contained four times and two-thirds in the total. Abdomen with two longitudinal series of somewhat indistinct pores, commencing at the chin and diverging behind the ventral fins. Above brown, sides and belly silvery; pores not shining silvery. Dorsal fin with four broad oblique black bands, and always with a black spot between two bands. The posterior half of the caudal blackish or with blackish spots. Anal with two blackish blotches posteriorly.

Coasts of Chile.

a, b. Fine specimens. Chile. From Mr. Bridges' Collection.

Fam. 23. PEDICULATI.

Pediculati, *Cuv. Règne Anim.* edit. 1817.
Pediculati, pt., *Cuv. & Val. Hist. Nat. Poiss.* xii. p. 335.

Head and anterior part of the body very large, without scales. Teeth in cardiform or villiform bands. The spinous dorsal either composed of a few more or less isolated spines, or entirely absent. Ventrals jugular, with four or five soft rays, absent in *Ceratias*; *the carpal bones prolonged, forming a sort of arm for the pectorals. Gill-opening reduced to a small foramen, situated in or near the axil.* Gills two and a half, three, or three and a half; pseudobranchiæ absent.

Carnivorous fishes, inhabiting the seas of the temperate and tropical regions.

Synopsis of the Genera.

Head depressed. Six dorsal spines, three of which are isolated, situated on the head	1. Lophius.
Head compressed. Three dorsal spines, the two posterior of which are connected by a membrane with each other and with the soft dorsal	2. Brachionichthys.
Head compressed. Three dorsal spines, the two anterior of which are connected by a membrane, the third being isolated..	3. Saccarius.
Head compressed. Three isolated dorsal spines	4. Antennarius.
Head depressed. One dorsal spine (rostral tentacle). Skin covered with minute spines........................	5. Chaunax.
Head depressed. One dorsal spine (rostral tentacle). Skin with conical tubercles. Palate toothed	6. Malthe.
Head depressed. Palate smooth..............................	7. Halieutæa.
Ventral fins none	8. Ceratias.

1. LOPHIUS.

Lophius, *Artedi, Genera*, p. 62.

Head exceedingly large, broad, and depressed; cleft of the mouth exceedingly wide; jaws and palate armed with cardiform teeth. Body naked; bones of the head with many spines. The three anterior dorsal spines isolated, situated on the head, modified into long tentacles,—the three following spines forming a continuous fin; the soft dorsal and anal short. Gills three. Pyloric appendages two.

Seas of the temperate regions of Europe, North America, Asia, and Africa.

1. Lophius piscatorius.

The Sea-Devil. Fishing Frog.

ʽΑλιὰς βάτου, *Aristot. Hist. Anim.* ix. c. 37, ii. c. 13, v. cap. 5 & 14.

Βάτραχος, ʽΑλιὰς, *Aristot.* ix. c. 37; *Ælian,* vii. p. 286; *Oppian,* ii. p. 33.

Rana, *Ovid,* v. p. 126; *Plin.* ix. c. 24, xxv. c. 10.

Rana marina, *Bellon.* p. 85: *Jonst. Pisc.* i. lib. 1. tit. 1. cap. 3. art. 3. punct. 9. p. 36. tab. 2. fig. 8.

—— piscatrix, *Rondel.* i. lib. 12. cap. 20. p. 363; *Salv. Hist. Aquat.* p. 129. fig. 47; *Gesner, Aquat.* iv. p. 813; *Willughby,* p. 85. tab. E. 1; *Ray, Syn.* p. 29; *Schonev.* p. 59; *Aldrov.* iii. c. 64. p. 466.

Lophius, *Artedi, Genera,* p. 63. sp. 1, *Synon.* p. 87; *Gronov. Mus.* i. p. 57, and *Zoophyl.* p. 58.

Batrachus, *Klein, Miss.* iii. p. 15. sp. 1 & 2.

Lophius piscatorius, *Linn. Syst. Nat.* i. p. 402, and *Faun. Suec.* p. 108; *Müll. Prodr. Zool. Dan.* p. 38; *Retz. Faun.* p. 308; *Brünn. Pisc. Mass.* p. 7; *Lacép.* ii. p. 140, i. pl. 13. fig. 1; *Bl.* iii. p. 82. tab. 87; *Bl. Schn.* p. 139; *Donov. Brit. Fishes,* v. pl. 101; *Turton, Brit. Faun.* p. 115; *Cuv. Règne Anim.*; *Flem. Brit. An.* p. 214; *Cuv. Règne Anim.*; *Low, Faun. Orcad.* p. 183; *Mohr, Isl. Naturh.* p. 61; *Faber, Fische Isl.* p. 55; *Shaw, Nat. Misc.* xi. pl. 422; *Bonap. Faun. Ital. Pesc.* c. fig.; *Cuv. & Val.* xii. p. 344. pl. 362; *Jen. Brit. Vert.* p. 389; *Parn. Wern. Mem.* vii. p. 253; *Yarr. Brit. Fishes,* i. p. 269, 2nd edit. i. p. 305, 3rd edit. ii. p. 388; *Nilss. Skand. Faun. Fisk.* p. 245; *Cuv. Règne Anim. Ill. Poiss.* pl. 84; *Gronov. Syst. ed. Gray,* p. 47; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 444; *Gaimard, Voy. Isl. et Grönl. Zool. Poiss.* pl. 19; *Guichen. Explor. Algér. Poiss.* p. 80.

Fishing Frog, *Borl. Cornw.* p. 266. pl. 27. fig. 5; *Penn. Brit. Zool.* iii. p. 105. pl. 18. edit. 1812, iii. p. 159. pl. 21.

Pontoppidan, Nat. Hist. Norw. ii. p. 244; *Duhamel, Pêches,* ii. sect. 9. p. 294. pl. 18; *Ascan. Ic.* tab. 35, 36; *Ström, Söndm.* i. p. 271.

Batrachus piscatorius, *Risso, Ichth. Nice,* p. 47, and *Eur. Mérid.* iii. p. 170.

Young.

Lophius eurypterus, *Düb. en Kor. Vet. Akad. Handl. Stockh.* 1844, p. 63. tab. 3. figs. 1–3; *Nilss. Skand. Faun.* iv. p. 251.

—— piscatorius, *Günth. Ann. & Mag. Nat. Hist.* March 1861, p. 190. pl. 10. figs. C–E.

Synonyms established on deformed specimens.

Lophius fergusonis, *Lacép.* i. pp. 303, 330; *Walb. Artedi,* iii. p. 496, founded on *Ferguson, Phil. Trans.* liii. p. 88. pl. 13.

Rana piscatrix, *Leight. Nat. Hist. Lancashire,* p. 186. pl. 6. fig. 5.

Lophius cornubicus, *Shaw, Zool.* v. p. 381, founded on the figure given by *Borlase.*

—— barbatus, *Montinus, Act. Holm.* iii. 1779, t. 4; *L. Gm.* i. p. 1480.

Anatomy.

Nervous system: *Camper in Mém. Sav. étrang. Acad. Sci.* 1774, vi. p.   , and *in Opusc. ed. Herbell,* ii. part 2. pl. 1. fig. 1; *Scarpa, de Auditu et Olfacto,* p. 68. pl. 4. fig. 1.

Osteology: *Owen, Osteol. Catal. Coll. Surg.* p. 73; *Agass. Poiss. Foss.* v. pl. M.

On the other anatomical details see the article in *Cuv. & Val. l. c.*, and in *Stannius, Vergl. Anat. Fische.*

D. 3 | 3 | 11–12. A. 9–11. C. 8. Cæc. pylor. 2.
Vert. 28–31 $\left(\frac{12-14}{16-17}\right)$.

Teeth arranged in two alternate series; two or three teeth on each side of the vomer; humeral spine with three points; the mouth behind the hyoid bone colourless.

Coasts of Europe; scarce beyond 60° N. lat. Cape Seas.

a. Adult: stuffed. Frith of Forth. From Dr. Parnell's Collection.
b. Half-grown: skin. South Devonshire. From Mr. Yarrell's Collection.
c. Half-grown. South Wales. Presented by J. Stokes, Esq.
d. Three feet long: stuffed. English Coast.
e. Half-grown: in spirits. British Coast.
f–k. Adult, half-grown, and young: skins and stuffed. British Coast.
l, m. Very large specimens: skeletons.
n. Skull of a very large specimen.

2. **Lophius setigerus.**

Lophius setigerus, *Wahl. Skrivt. af Naturh.* iv. p. 214. tab. 3. figs. 5, 6; *Cuv. & Val.* xii. p. 383; *Schleg. Faun. Japon. Poiss.* p. 158. pl. 80; *Richards. Ichth. Chin.* p. 203; *Bleek. Verhand. Batav. Genootsch.* xxv., *Japan*, p. 46.
—— viviparus, *Bl. Schn.* p. 142. tab. 32.

D. 3 | 3 | 8–9. A. 6–7. C. 8. Vert. 19.

Teeth arranged in two alternate series in the upper jaw, in three in the lower; two or three teeth on each side of the vomer; humeral spine terminating in three points; the mouth behind the hyoid bone purplish-black, with white spots.

Coasts of China and Japan.

a. Half-grown. Japan. Purchased of Mr. Frank.
b–c. Young: bad state. From the Haslar Collection.
d–t. Half-grown and young: dried. From Chinese insect-boxes.

The small number of vertebræ proves the distinctness of this species from the European *L. piscatorius.* The anterior vertebræ are very short, the middle and posterior ones nearly equal in length.

3. **Lophius budegassa.**

Lophius budegassa, *Spinola in Ann. Mus.* 1807, p. 376; *Risso, Eur. Mérid.* iii. p. 170; *Bonap. Faun. Ital. Pesc.* c. fig.
—— piscatorius, var. A., *Risso, Ichth. Nice,* p. 48.
—— parvipinnis, *Cuv. Règne Anim.*
—— piscatorius, var., *Cuv. & Val.* xii. p. 372.

D. 3 | 3 | 9. A. 9. C. 8. Vert. 27–30.

Teeth arranged in two alternate series; two or three teeth on each side of the vomer; humeral spine long, lanceolate, simple; the mouth behind the hyoid bone colourless.

Mediterranean.

a. Half-grown. Mediterranean. Purchased of Mr. Frank.

Spinola, Risso, Cuvier, and Bonaparte have endeavoured to distinguish a second Mediterranean species of *Lophius*, which they have characterized either by its colour, or the number of its dorsal rays, or the different length or shape of the first dorsal spine,—characters which have been considered by Valenciennes as so variable, that he did not adopt the species founded on them. The most important of these characters is that used by Cuvier, namely the number of the dorsal rays. In all the *immature* specimens of *L. piscatorius* and of *L. budegassa* which I have examined, the number of the dorsal rays of the former was not less than eleven, and of the latter not more than nine; but this character becomes uncertain in large individuals, in which one or two of the first rays appear to be lost with age. A better character for the distinction of the two Mediterranean species, and one which can be depended upon, is the form of the humeral spine: the teeth with which it is provided, in *L. piscatorius*, never being effaced, although they are more obtuse in old specimens than in young ones.

The three preceding species can be characterized sufficiently to admit them into the system. The following were established for single individuals, which, coming from distant localities, showed some slight differences from the European species:—

1. *Lophius americanus*, Cuv. & Val. xii. p. 380; Dekay, New York Fauna, Fishes, p. 162. pl. 28. fig. 87 (bad).
   Lophius piscatorius, Mitch. Lit. & Phil. Trans. New York, i. p. 465; Richards. Faun. Bor. Amer. Fishes, p. 103; Storer, Mass. Report, pp. 71, 404.

No differences of any importance have been pointed out, and this species is probably identical with *L. piscatorius*. Valenciennes states eight or nine as the number of the dorsal rays; but the specimen examined is stuffed, and in bad condition. Dekay, who professes to have seen several specimens, is unable to point out the specific characters; the numbers given by him (D. 3 | 3 | 12. A. 10) would lead to the opinion that it is most nearly allied to *L. piscatorius*.

2. *Lophius vomerinus*, Cuv. & Val. xii. p. 381, from the Cape, is established upon a single specimen which had no teeth on the corners of the vomer; these may have been lost, the specimen being more than two feet long. D. 3 | 3 | 10. A. 9. In other respects the description agrees very well with the Cape specimen in the British Museum.

3. *Lophius upsicephalus*, Smith, Ill. Zool. South Africa, Pisces. pl. 9. The figure is wretched, and taken from a specimen deformed by stuffing. It has vomerine teeth, and we therefore refer to this species a stuffed specimen from the Cape, forty-one inches long. I am unable to ascertain the number of the dorsal rays and the form of

the humeral spine. The lateral teeth of the intermaxillary are smaller and more numerous than in the European species, to which otherwise it bears the strongest resemblance. Sir A. Smith states seven or eight rays for the dorsal and anal fins.

2. BRACHIONICHTHYS*.

Chironectes, pt., *Cuv. Règne Anim.*
Brachionichthys, *Bleeker, Natuurk. Tydschr. Nederl. Ind.* vii. 1854, p. 121.

Head large, high, compressed; cleft of the mouth directed forwards; jaws with cardiform teeth; palate smooth. Body smooth, or covered with minute spines. Three slender dorsal spines, the two posterior of which are connected by a membrane with each other and with the soft portion; the anterior modified into a tentacle, situated above the snout. The soft dorsal is longer than the anal. Stomach of moderate size; pyloric appendages none. Air-bladder absent.

Sea of Tasmania.

1. Brachionichthys hirsutus.

Lophius hirsutus, *Lacép. Ann. Mus.* iv. p. 202. pl. 55. fig. 3.
Chironectes punctatus, *Cuv. Mém. Mus.* iii. p. 434. pl. 18. fig. 2.
—— hirsutus, *Cuv. & Val.* xii. p. 434.
Brachionichthys hirsutus, *Bleek. l. c., & Visschen van Van Diemen's Land*, p. 22. fig. 2.
Skeleton: *Cuv. l. c.* fig. 5.

D. 1 | 2 | 19. A. 9. P. 7. V. 1/4. Vert. 12/10.

The height of the body is one-fourth of the total length. Skin rough. The anterior dorsal spine is free, terminating in a small lobe; the two others are joined into one fin, separate from the soft dorsal. Brownish-grey, with brown dots; a black spot on the second, third and fourth dorsal rays.

Van Diemen's Land.

2. Brachionichthys lævis.

Lophius lævis, *Lacép. l. c.* fig. 4.
Chironectes unipennis, *Cuv. l. c.* p. 435. pl. 18. fig. 3.
—— lævis, *Cuv. & Val.* xii. p. 437.

D. $\frac{3}{16}$. A. 9. P. 7. V. 1/4.

The height of the body is one-fourth of the total length. Skin nearly smooth, covered with minute spines. The dorsal spines are connected with one another and with the soft dorsal by a membrane, which, however, is notched between the first and second spines and between the third and the soft dorsal. Reddish-brown.

Hab. ——?

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* *Seba*, i. 74. 3; *Cuv. & Val.* xii. p. 433, may belong to this genus.

Chironectes politus, Richards. Trans. Zool. Soc. iii. p. 133, and Voy. Ereb. and Terr. Fishes, p. 16. pl. 9. fig. 2, is closely allied to, if not identical with, this species. It is from Van Diemen's Land.

3. SACCARIUS.

Head very large, high, compressed; cleft of the mouth vertical; jaws and palate armed with cardiform teeth. Body covered with minute spines. Three dorsal spines, the two anterior of which are united by a membrane; the first slender, the third entirely separated from the soft dorsal. The latter fin of moderate length, longer than the anal. Gill-apparatus as in *Antennarius*. Stomach very wide.

Coast of New Zealand.

1. Saccarius lineatus.

D. 2 | 1 | 12. A. 7. C. 9. P. 10. V. 5.

The height of the body is contained twice and two-fifths in the total length. Cleft of the mouth subvertical, with bands of cardiform teeth in the jaws and on the palate. Skin very rough, covered with small simple and forked spines; series of small spiny tubercles round the eye and along the lateral line; some short cutaneous fringes at the angle of the mouth. The dorsal spines are broadly webbed posteriorly, the membrane between the two anterior ones uniting them into one fin, although it is deeply notched. The first spine is slender, rather longer than the second, enveloped in transparent membrane, and only free at its extremity, which terminates in a small tentacle; the second is stout and, like the third, enveloped in rough skin. The soft dorsal terminates at some distance from the caudal fin, and its last ray does not extend to the root of the latter. The ventrals are shorter than the maxillary bone. Ground-colour olive-yellowish; head and body with numerous brown stripes, oblique on the head and trunk, vertical along the base of the dorsal and anal fins, longitudinal on the tail. Vertical fins with two or three series of black ocellated spots.

Sea of New Zealand.

	inches.	lines.
Total length	5	6
Height of the body	2	4

a. Bay of Islands. Presented by Sir A. Smith.

4. ANTENNARIUS*.

Chironectes, pt., *Cuv. Règne Anim.*
Antennarius, *Commers.*; *Cuv. Règne Anim.*

Head very large, high, compressed; cleft of the mouth vertical or subvertical; jaws and palate armed with cardiform teeth. Body

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[*] 1. Chironectes pavoninus, *Cuv. & Val.* xii. p. 421.—Typical specimen at Göttingen.
2. —— chlorostigma, (*Ehrenb.*) *Cuv. & Val.* xii. p. 426.—Massuah. 3.

naked, or covered with minute spines. The spinous dorsal is reduced to three isolated spines, the anterior of which is modified into a tentacle, situated above the snout. The soft dorsal of moderate length, longer than the anal. No cleft behind the fourth gill; only one-half of the anterior arcus branchialis is provided with lamellæ. Pseudobranchiæ none. Stomach very wide; pyloric appendages none. An air-bladder.

Seas between the tropics.

There is scarcely another genus of fishes which offers so much difficulty in the discrimination of the species as the present. First we may state the fact, that most of the species of this genus are inhabitants of the seas between the tropics, living on floating sea-weed, and enabled, by filling the spacious stomach with air, to sustain themselves on the surface of the water. They are therefore found in the open sea as well as near the coasts, and being bad swimmers, are driven with the currents into which they happen to fall. Thus it is a natural consequence that at least some of the species should have a very wide geographical range, not only over the Atlantic, but also over the Indian Ocean. This circumstance has been entirely disregarded by several naturalists, who have readily admitted the identity of the species in specimens from the Ile de France, New Ireland, and the Sandwich Islands, but have opposed the idea of the same identity of fishes from the Brazil coast, the Cape, and the Ile de France: they have constantly separated the Atlantic from the Indian specimens; and the great variability to which the species of this genus are subject gave them ample opportunity of affixing some characters to the fictitious species. This variability is so great, that scarcely two specimens will be found which are exactly alike; it extends not only to the coloration, but to the spines and cuticular appendages, which are more developed in age, to the length and flexibility of the second and third dorsal spines, and to the form of the tentacle above the snout, which, being tender and delicate, is necessarily often injured, and probably reproduced. Whenever I had an opportunity of examining specimens agreeing with the descriptions given, I was enabled to refer them to the typical form of which they are merely individual varieties, or to decide whether they should really form a distinct specific group; but when I had no such opportunity, it would have been too hazardous to treat them as merely synonyms, and therefore I have preferred to admit them into the list of species, although I have

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3. Chironectes trisignatus, *Richards. Voy. Ereb. & Terr. Fishes,* p. 15. pl. 9. fig. 1.—*Hab.* ——?
4. —— mentzelii, *Cuv. & Val.* xii. p. 417.—West Indies.
5. *Marcgr.* p. 150.—Chironectes furcipilis, *Cuv. Mém. Mus.* iii. p. 329. pl. 17. fig. 1.—*Cuv. & Val.* xii. p. 423.
6. *Seba,* i. 74. 6.—Lophius marmoratus, *Shaw, Nat. Misc.* v. t. 176, and *Zool.* v. p. 386. pl. 165.—Pacific.
7. Chironectes bicornis, *Lowe, Proc. Zool. Soc.* 1839, p. 84, and *Trans. Zool. Soc.* iii. p. 10.—Madeira.
8. Antennarius dorehensis, *Bleek. Act. Soc. Sc. Indo-Nederl.* vi., *Nieuw-Guinea,* p. 21.—New Guinea.

not the slightest doubt that more than one-half of them will prove to be individual varieties.

Synopsis of the Species.

a. Skin naked or not very rough. Ocellated spots none.

* White spots on the belly.

1. A. marmoratus.

** No white spots on the belly.

2. A. barbatulus.

b. Anterior dorsal spine terminating in two spindle-like tentacles.

3. A. histrio. 4. A. tigris.

c. Ground-colour light, densely marbled and variegated with darker; ocellated spots none. Skin rough. Anterior dorsal spine with flat tentacles.

5. A. hispidus. 6. A. pinniceps. 7. A. tridens.

[The following species appear to belong to this division :—]

8. A. moluccensis. 9. A. coccineus. 10. A. lindgreeni.

d. Caudal fin with transparent, black-edged ocelli.

11. A. urophthalmus.

e. Colour nearly uniform black or brown; anterior dorsal spine with flat tentacles.

12. A. commersonii. 13. A. principis.

[The following species, perhaps, are merely varieties :—]

14. A. horridus. 15. A. melas.

f. Ocellated black spots on the vertical fins and more or less on the body.

16. A. multiocellatus. 17. A. nummifer.

[Other species closely allied to this division are—]

18. A. notophthalmus. 22. A. caudimaculatus. 25. A. polyophthalmus.
19. A. ocellatus. 23. A. chironectes. 26. A. phymatodes
20. A. biocellatus. 24. A. pardalis. (A. oligospilos).
21. A. tenebrosus. 27. A. leprosus.

g. Head and anterior portion of the back immaculate, rose-coloured; the remainder reticulated with black.

28. A. bigibbus.

h. Dorsal with fifteen rays.

29. A. bougainvillii.

1. **Antennarius marmoratus.**

Seba, i. 74. 4 (very bad).
Cochinchina Lophius, *Shaw, Nat. Misc.* vol. xxiii. pl. 1012 (deformed).
Skeleton: *Cuv. Mém. Mus.* iii. pl. 18. fig. 4 (Chironectes lævigatus).

D. 3 | 12. A. 7. P. 10. Vert. 9/9.

The anterior dorsal spine is short, terminating in a small knob with a minute tentacle attached to it; sometimes it is very short, or entirely absent. The last dorsal ray extends to, or slightly beyond, the root of the caudal, if laid backwards. Head and body with cutaneous tentacles, those on the angle of the mouth and on the belly being the most conspicuous; each tentacle of the latter rooting in the centre of a round white spot. The second and third dorsal spines fringed on the top. Ground-colour yellowish or reddish, largely marbled with brown; brown spots radiating from the eye; most of the spots edged with white. Round white spots on the sides of the body, and more crowded on the belly.

Seas between the Tropics.

Var. *α. picta.*

? Guaperva sinensis, *Linné, Reise durch Westgothland,* tab. 3. fig. 5 *a* & *b*. p. 160.
Lophius, *Gronov. Zoophyl.* no. 208.
Balistes, *Gronov. Mus. Ichth.* i. p. 53. no. 116.
? Lophius histrio, var. *b.* pictus, *Bl. Schn.* p. 142.
Chironectes pictus, *Cuv. & Val.* xii. p. 393. pl. 364.
—— arcticus, *Düb. en Kor. Vet. Akad. Handl.* 1844, p. 72. tab. 3. figs. 4, 5; *Nilss. Skand. Faun.* iv. p. 257.
Lophius histrio, *Gronov. Syst. ed. Gray,* p. 48 (not syn.).

Skin entirely smooth. The third dorsal spine nearly one-half of the height of the body. The brown spots on the body light chestnut-brown, the white spots on the belly nearly as large as the eye; irregular brown longitudinal bands on the dorsal and anal fins, those on the caudal transverse.

Young of this variety.

Lophius tumidus, *L. Mus. Ad. Fried.* p. 56; *Osbeck, Reise nach China,* p. 400.
Chironectes tumidus, *Cuv. & Val.* xii. p. 397.

The third dorsal spine is nearly entirely enveloped in the skin.

Atlantic; occasionally extratropical.

a–b. Half-grown. West Indies. Presented by Dr. J. E. Gray.
c–d. Young. Atlantic, between 22° and 25° N. lat. and 48° W. long. From Mr. Rouse's Collection.
e–g. Young. (? Lake Chalco, near Mexico.) Presented by Robert James, Esq.
h. Young. Open sea. Presented by J. B. Godfrey, Esq.
i, k, l–n, o, p, q–r, s–w. Adult, half-grown, and young.
x. Half-grown: skin. From Gronow's Collection.

Var. *β.*

Skin minutely granulated. The length of the third dorsal spine is rather less than one-half of the height of the body. The brown spots on the body light chestnut-brown; white spots numerous, nearly as large as the eye; the bands of the dorsal are irregular, oblique, those on the caudal transverse, and those on the anal irregular and longitudinal.

Atlantic and Indian Oceans.

a. Half-grown. Molucca Sea. Purchased of Mr. Frank.

b–c, *d–e*. Half-grown and young. Indian Ocean.
f. Half-grown. Atlantic. Presented by Captain Sir E. Belcher, C.B.
g, *h*. Adult: not good state.

Var. γ. *ranina*.

Lophius raninus, *Tiles. Mem. Natur. Mosc.* xi. pl. 16.
Chironectes lævigatus, *Cuv. Mém. Mus.* iii. p. 423. pl. 16. fig. 1; *Cuv. & Val.* xii. p. 399; *Storer, Rep. Mass.* p. 73; *Dekay, New York Fauna, Fishes*, p. 165. pl. 27. fig. 83.
Antennarius nitidus, *Benn. Zool. Journ.* iii. p. 375. tab. 9. fig. 2.
Chironectes pictus, var. vittatus, *Richards. Voy. Ereb. & Terr. Fishes*, p. 15. pl. 9. figs. 3, 4.

Skin minutely granulated. The length of the third dorsal spine is one-third of the height of the body. The brown spots blackish-brown, slightly edged with white; white spots small, and not numerous; bands on the vertical fins broad and spot-like.

Atlantic, Indian, Chinese, and Japanese Seas.

a, *b*, *c*, *d*, *e*. Half-grown and young. China. Presented by Captain Sir E. Belcher, C.B.
f. Adult. Sea of Pinang. From Dr. Cantor's Collection.
g, *h*. Half-grown and young.

Var. δ. *gibba*.

Lophius gibbus, *Mitch. in Phil. & Lit. Trans. New York*, i. pl. 4. fig. 9, and *Am. Month. Mag.* ii. p. 325 (from a discoloured specimen).
Chironectes gibbus, *Dekay, New York Fauna, Fishes*, p. 164. pl. 24. fig. 74.

Skin very distinctly granulated. The length of the third dorsal spine is one-third or rather less than one-third of the height of the body. The brown spots on the body dark greyish-brown, with narrow white edges. White spots scattered, nearly as large as the eye; the bands on the dorsal oblique, on the caudal transverse, and on the anal longitudinal: all with dots of a deeper brown.

Atlantic; Australia.

a, *b*, *c*. Adult and young. West coast of Africa.
d. Adult. Australia. Presented by T. Baines, Esq.
e, *f*. Adult and half-grown: not good state.

Var. ε. *marmorata*.

? Batrachus mollis, *Klein, Miss.* iii. p. 16. tab. 3. fig. 4.
? Lophius histrio, var. marmoratus, *Bl. Schn.* p. 142.
Lophius geographicus, *Quoy & Gaim. Voy. Uran.* i. p. 355. pl. 65. fig. 3 (deformed).
Chironectes marmoratus, *Less. Voy. Coq. Zool.* ii. p. 145, *Poiss.* pl. 16. fig. 2 (bad); *Cuv. & Val.* xii. p. 402; *Faun. Japon. Poiss.* p. 159. pl. 81. fig. 1.
—— nesogallicus, *Cuv. & Val.* xii. p. 401; *Bleeker, Solor*, p. 84.
Antennarius nesogallicus, *Guér.-Méner. Iconogr.* iii. pl. 41. fig. 2.
—— raninus, *Cant. Catal.* p. 202; *Bleek. Ceram*, ii. p. 707, and *Act. Soc. Sc. Indo-Nederl.* iii., *Celebes*, p. 12.

Skin very distinctly granular. The length of the third dorsal spine is less than one-third of the height of the body. The brown spots are blackish-brown, with black dots; black dots on the lower parts of the body. White spots scattered, smaller than the eye. The bands on the dorsal oblique, on the caudal transverse, and on the anal longitudinal and irregular.

From the Eastern coasts of Africa through the East Indies to Polynesia.

a. Adult. Madagascar. Purchased of Mr. Frank.
b. Adult: skin. From the Collection of the East India Company.

Var. ζ.

Skin minutely granulated. The third dorsal spine one-third of the height of the body. The white spots scattered and small. A round brown spot between the base of the eighth and tenth dorsal rays.

Atlantic.

a. Adult. From the Collection of the Zoological Society.
b. Adult. Atlantic. From the Haslar Collection.

2. **Antennarius barbatulus.**

Chironectes barbatulus, *Eyd. & Soul. Voy. Bonite, Poiss.* p. 184. pl. 5. f. 1.

D. 3 | 12. A. 7. P. 10.

The anterior dorsal spine is as long as, and placed at the base of, the second, slightly swollen at its extremity; the second and third bear short cutaneous fringes on their anterior side. Skin scarcely granular, with some tentacles on the lower side of the head. The dorsal and anal fins are somewhat elevated, and their last rays appear to extend beyond the root of the caudal, if laid backwards. Rose-coloured, slightly marbled with yellowish. (*Eyd. & Soul.*)

Hab. —— ?

3. **Antennarius histrio.**

Lophius, *Brown, Jamaica*, p. 457. no. 1; *Gronov. Zoophyl.* no. 210.
Guaperva, *Marcgr.* p. 150.
Lophius histrio, *L. Syst.* i. p. 493; *Bl.* taf. 111; *Bl. Schn.* p. 142 (not var.).
—— striatus, *Shaw, Nat. Misc.* v. pl. 175, and *Zool.* v. p. 385.
Chironectes scaber, *Cuv. Mém. Mus.* iii. p. 425. pl. 16. fig. 2; *Cuv. & Val.* xii. p. 412; *Cuv. Règne Anim. Ill. Poiss.* pl. 85. fig. 1.
—— histrio, *Pocy, Mem. Cub.* p. 217.
Lophius spectrum, *Gronov. Syst. ed. Gray*, p. 49.

D. 3 | 12. A. 7. P. 9–10.

The anterior dorsal spine is as long as the second, and provided with two long and thick cutaneous flaps at its top. The third dorsal spine is not continuous with the soft dorsal. The soft dorsal fin terminates at some distance from the caudal, and its last ray does not extend to the root of the caudal, if laid backwards. Dorsal spines, head, back, and sides of the body with more or less numerous cutaneous fringes, those of the dorsal spines sometimes forming a dense cluster. Skin very rough, covered with small spines. Ground-colour yellowish or reddish, with numerous brown spots, those round the eye forming radiating streaks. Dorsal and anal fins with three series of round brown spots, the middle of which is formed by the largest spots and the most constant. Sometimes uniform brown.

Caribbean Sea. (? Sea of Otaheite.)

a. Adult: skin. Caribbean Sea. From Dr. Parnell's Collection.
b, c. Adult. (? Otaheite.) Cook's Voyage.—Types of *Lophius striatus*, Shaw.
d, e. Adult. From the Collection of the Zoological Society.
f, g. Adult: stuffed.

Var. *α*.

Chironectes principis, pt., *Cuv. & Val.* xii. p. 416 (the first figure "d'un brun très-foncé," &c.).

Head and body brown, without distinct markings; spots on the dorsal and caudal fins distinct.

a. Adult. From the Collection of the Zoological Society.

Var. *β*.

Uniform brown.

a, b. Half-grown. Caribbean Sea. From the Collection of the Zoological Society.
c. Half-grown: discoloured.

4. Antennarius tigris.

Chironectes tigris, *Poey, Mem. Cub.* i. p. 217. lam. 17. fig. 2.

D. 3 | 12. A. 7. P. 11.

The anterior dorsal spine is longer than the second, terminating in two long cutaneous flaps. The third dorsal spine is connected with the soft dorsal by a broad membrane; the latter terminates at some distance from the caudal, and its last ray does not extend to the root of the caudal, if laid backwards. Skin rough, covered with small spines, without cutaneous fringes. Ground-colour yellow, with numerous brown spots and streaks, the latter radiating from the eye; dorsal fin irregularly spotted, without a series of large round brown spots. (*Poey*.)

Sea of Cuba.

5. Antennarius hispidus.

Koelreuter, Nov. Comm. Petrop. x. p. 337. tab. 8. fig. 1; *Russell*, pl. 19.
Lophius hispidus, *Bl. Schn.* p. 143.
Chironectes lophotes, *Cuv. Mém. Mus. Hist. Nat.* iii. p. 428. pl. 17. fig. 2.
—— hispidus, *Cuv. & Val.* xii. p. 407.
Antennarius hispidus, *Cant. Catal.* p. 203; *Bleek. Amboina & Ceram*, p. 280.

D. 3 | 12. A. 7.

The anterior dorsal spine is of moderate length, and terminates in a lanceolate ciliated flap. A cutaneous fold extends from the third dorsal spine to the soft dorsal fin. The soft dorsal terminates at some distance from the caudal fin, and its last ray does not extend to the root of the latter. Body and head with a few short fringes. Skin very rough, covered with small spines. Ground-colour yellow, with numerous brown spots and streaks, some of the latter radiating from the eye, others extending on the dorsal fin, which has no series of large round spots.

East Indian Seas.

a. Adult: stuffed. East Indies. From the Collection of the East India Company.

6. **Antennarius pinniceps.**

Antennarius pinniceps, (*Commerson*) *Cuv. & Val.* xii. p. 410; *Bleek. Act. Soc. Sc. Indo-Nederl.* i., *Amboina,* p. 49.
Lophius histrio, *Lacép.* i. pp. 302, 320.
Antennarius tridens, *Schleg. Faun. Japon. Poiss.* pl. 81. fig. 4.
Chironectes scaber, *Bianconi, Spec. Zool. Mosamb.* fasc. 10. p. 219.

D. 3 | 12. A. 7. P. 10.

The anterior dorsal spine is as long as the second, terminating in three lanceolate flaps. The dorsal fin terminates at a considerable distance from the caudal. Skin rough, covered with small spines and with some small cutaneous fringes. Yellowish, irregularly spotted and streaked with brown; streaks radiating from the eye; a series of large round brown spots along the middle of the dorsal; dorsal and anal with round spots.

East Indian Seas.

Var. *a*. *pinniceps.*

Belly with large round spots.
Ile de France.

a. Adult. Indian Ocean. Purchased of Mr. Frank.
b. Adult: bad state. From the Haslar Collection.

Var. *β*. *Bleekeri.*

Belly immaculate.
Sea of Amboyna.

Antennarius lacepedii, Bleek. Act. Soc. Sc. Indo-Nederl. i. p. 50, from Amboyna, is very similar to this species, having the round spots on the dorsal fin and on the belly, but only two lobes at the extremity of the anterior dorsal spine.

One of the specimens figured by Schlegel (Faun. Japon. Poiss. pl. 81. fig. 4), under the name of *Ch. tridens,* appears to me to belong to this species, having a series of large round spots on the dorsal fin.

7. Antennarius tridens.

Chironectes tridens, *Schleg. Faun. Japon. Poiss.* p. 159. pl. 81. figs. 2, 3 & 5; *Bleek. Verhand. Batav. Genootsch.* xxv., *Japan*, p. 47.

D. 3 | 11–12. A. 7. P. 10.

The anterior dorsal spine is longer than the second, and terminates in three cutaneous flaps; a fold of the skin extends from the third dorsal spine to the soft dorsal. The soft dorsal fin terminates at some distance from the caudal, and its last ray does not extend to the caudal, if laid backwards. Skin very rough, covered with small spines; body without any fringes or tentacles. Ground-colour yellowish; head and body with more or less numerous brown spots, those round the eye forming radiating streaks; the spots are sometimes reduced to mere specks; dorsal fin with small spots of irregular shape, not forming a series.

Seas of China and Japan.

a. Adult. China. Presented by J. R. Reeves, Esq.

8. Antennarius moluccensis.

Bleeker, Amboina, vi. p. 424.

D. 3 | 12–13. A. 8. P. 11.

The anterior dorsal spine is of moderate length, with a short ciliated flap; the second and third broadly webbed posteriorly. Skin rough, without cutaneous fringes. Body and fins with irregular oblong black spots; a reticulated rose-coloured band from the back to the pectoral; a series of four rose-coloured spots along the side of the body, reticulated with black; a similar spot on the back of the tail and on the membrane behind the second dorsal spine; fins deep violet, or densely spotted towards the margin, and with the tips of the rays yellowish. A rose-coloured cross-band on the base of the caudal, reticulated with black; several other black transverse streaks on the remainder of the fin.

Seas of Amboyna and Goram.

a. Adult. From the Collection of the Zoological Society.

9. Antennarius coccineus.

Chironectes coccineus, *Less. & Garn. Voy. Coq. Poiss.* p. 143. pl. 16. fig. 1; *Cuv. & Val.* xii. p. 430.

D. 3 | 12. A. 7.

The head and the snout are so short, that the cleft of the mouth ascends in an oblique line, which is somewhat directed backwards. The anterior dorsal spine is short, stiff, terminating in a small simple tentacle situated between the eyes. Skin rough, covered with small spines, without cutaneous fringes. The third dorsal spine is nearly entirely hidden in the skin. Red, clouded with blackish and greyish; region above the pectoral blackish.

Mauritius.

10. Antennarius lindgreeni.

Bleek. Natuurk. Tydschr. Nederl. Ind. 1855, viii. p. 192.

D. 3 | 13. A. 7. P. 9.

The cleft of the mouth is subvertical, and ascends in an oblique line which is slightly directed forwards; the length of the maxillary bone is contained five times and three-quarters in that of the body. The anterior dorsal spine is of moderate length, terminating in many broad and long flaps. The second spine is only one-half the length of the third, which is shorter than the maxillary; dorsal fin more than twice as long as the anal; the length of the caudal is one-fourth of the total. Skin rough, covered with small spines and with cutaneous fringes. Red, reticulated with black; the outer halves of the fins with black variegations; caudal with eight or nine black undulated cross-streaks. (*Bl.*)

Sea of Banka.

11. Antennarius urophthalmus.

Chironectes caudimaculatus, *Richards. Voy. Ereb. & Terr. Fishes*, p. 125. tab. 60. figs. 8, 9 (not *Rüpp.*).
Antennarius urophthalmus, *Bleek. Natuurk. Tydschr. Nederl. Ind.* ii. p. 488, and xv. p. 237.

D. 3 | 13. A. 8. P. 9.

Anterior dorsal spine rather short, terminating in a ciliated flap. The third dorsal spine is connected by a membrane with the base of the soft dorsal. Dorsal and anal fins extend to the root of the caudal. Skin rough, covered with small spines and with scattered cutaneous fringes, two at the chin being the longest. Orange-coloured, densely spotted and reticulated with black; the membrane between the caudal rays with transparent ocelli, edged with black.

Seas of Singapore, Riouw, and Australia.

a. Adult. Singapore. Presented by General Hardwicke.
b–c, *d*. Adult. Australia.
e. Adult. Stuffed.

12. Antennarius commersonii.

Lophius commersonii, *Lacép.* i. p. 327.
Chironectes commersonii, *Cuv. Mém. Mus.* iii. p. 431. pl. 18. fig. 1; *Cuv. & Val.* xii. p. 426.
Antennarius commersonii, *Cant. Catal.* p. 204.

D. 3 | 13–14. A. 7–8. P. 9–11.

Skin very rough, covered with small spines. The anterior dorsal spine much longer than the second, terminating in a fringed lobe. The dorsal fin terminates near the caudal, and its last ray extends to the root of the caudal. Nearly uniform black or brownish-black, with some white spots; pectoral and ventral fins white-edged.

Indian Ocean.

Var. *α. Commersonii.*

A small white spot above the axil of the pectoral. P. 11.

Ile de France and Amboyna.

a. Fine specimen: ten inches long. Amboyna. Purchased of Mr. Frank.

Var. *β. Cantoris.*

On the back, above the lateral line and in front of the first articulated ray, an oblique rose-coloured (in life) spot, within which a black ring; at the root of the caudal, above and below, two similar smaller spots, and one on the side between the pectoral and anal fins; on the posterior part of the caudal a broad submarginal rose-coloured band, within which four somewhat undulating black lines, edged with black. Between the third and ninth caudal rays a rose-coloured cross-band, divided in the middle by a black line. The other fins with a broad submarginal rose-coloured band, edged with black. P. 9.

Sea of Singapore.

Var. *γ. Musei britannici.*

Brownish-black; throat with indistinct undulating black lines. Top of the third dorsal spine white; a narrow and short white cross-band before the first dorsal ray; anal and dorsal fins with a narrow white posterior margin; caudal with two white cross-bars, one near the root, the other across the posterior margin. P. 9.

Hab. —— ?

a. Fine specimen.

13. Antennarius principis.

Chironectes principis, pt., *Cuv. & Val.* xii. p. 416 (the second figure with "tout le corps noir," &c.).

D. 3 | 11. A. 7. P. 10.

The anterior dorsal spine is twice as long as the second, terminating in a small slender lobe. The membrane behind the third spine extends to the root of the soft dorsal fin. The latter terminates at some distance from the caudal, and its last ray does not extend to the base of the caudal. Skin rough, covered with small spines, without cutaneous fringes. Black; tips of the pectoral and ventral fins and a small spot above the pectoral white.

Tropical parts of the Western Atlantic.

a. Fine specimen. Para.
b. Half-grown: rather discoloured.

14. Antennarius horridus.

Bleeker, *Solor*, p. 83.

D. 3 | 12. A. 7. P. 10.

Anterior dorsal spine of moderate length, terminating in a simple lobe. Skin rough, covered with small spines, without cutaneous appendages. Blackish-brown, the lower parts and the fins brown; a yellow cross-band before the first dorsal ray, descending towards the opercles and widening below; a round yellowish spot above the axil; belly and vertical fins with large round black spots, edged with reddish; a yellowish band across the back of the tail, and a spot of the same colour on the upper angle of the caudal fin; tips of the pectoral and ventral rays yellowish. (*Bleek.*)

East Indian Archipelago.

Closely allied to some of the varieties of *A. commersonii*, but said to have only twelve dorsal rays.

15. **Antennarius melas.**

Bleek. Act. Soc. Sc. Indo-Nederl. ii., *Amboina*, p. 70.

D. 3 | 12. A. 7. P. 10.

The anterior dorsal spine is of moderate length, terminating in two lobes. Skin rough, covered with small spines, without cutaneous fringes. Blackish-brown: belly brown; dorsal and caudal fins with a few indistinct small black spots. Tips of the pectoral and ventral rays yellow. (*Bl.*)

Sea of Amboyna.

16. **Antennarius multiocellatus.**

D. 3 | 11–12. A. 7. P. 10.

The anterior dorsal spine is longer than the second, terminating in a fringed lobe. The dorsal fin terminates at some distance from the caudal, and its last ray extends to, or very nearly to, the root of the latter. Skin rough, covered with minute spines, with or without cutaneous fringes. Red or whitish, minutely dotted with violet, and with several blackish ocelli: one on the base of the eighth and ninth dorsal rays, another on the base of the fifth and sixth anal rays, and three on the middle of the caudal fin, disposed in a triangle.

Var. *α. multiocellata.*

Chironectes multiocellatus, *Cuv. & Val.* xii. p. 420; *Poey, Mem. Cub.* p. 220.

Red, with several small ocelli on the body, one behind the pectoral; the violet dots chiefly conspicuous on the membranes of the vertical fins. Cutaneous fringes none.

Caribbean Sea.

a. Fine specimen: thirty lines long. From the Collection of the Zoological Society.

?*b.* Half-grown: discoloured. China Seas. Presented by Captain Sir E. Belcher, C.B.

Var. *β. Probably adult state.*

Reddish, marbled with olive and brown, these variegations forming several rings and ocelli on the side of the body; one above the pectoral, with a white dot and a small tentacle in the centre. Head and body with many short cutaneous fringes.

Caribbean Sea.

a. Fine specimen: five inches long. Caribbean Sea. From the Collection of the Zoological Society.

b. Half-grown: skin. Caribbean Sea. From Dr. Parnell's Collection.

c. Adult: stuffed: bad state.

Var. γ. *leucosoma*.

Lophius pictus, *Shaw, Nat. Misc.* pl. 176. fig. 1, and *Zool.* v. p. 386. pl. 165.
Antennarius leucosoma, *Bleek. Floris*, p. 328.

White, dotted all over with violet; a brown spot between the second and third dorsal spines, including the top of the former; an irregular brown band descends from the first dorsal ray towards the pectoral, including an ocellus with white centre posteriorly; an irregular brown spot on the back of the tail, including the last dorsal ray, and emitting a vertical streak across the root of the caudal. A brown ocellus behind the middle of the side of the body; three small ones below the upper margin of the anterior part of the dorsal fin. Cutaneous fringes none.

Seas of Amboyna and Floris.

a. Fine specimen: thirty lines long. Amboyna. Purchased of Mr. Frank.

Shaw's figure agrees very well with the specimen in the British Museum; but he represents the ground-colour dark and the markings light.

Var. δ. *leprosa*.

Chironectes leprosus, *Eydoux & Souleyet, Voy. Bonite, Zool.* i. p. 187, *Poiss.* pl. 5. fig. 3.

Ground-colour blackish-brown, irregularly marbled with greyish. Cutaneous fringes none.

Sandwich Islands.

17. Antennarius nummifer.

Chironectes nummifer, *Cuv. Mém. Mus.* iii. p. 430. pl. 17. fig. 4; *Cuv. & Val.* xii. p. 425; *Rüpp. N. W. Fische*, p. 141.
Antennarius nummifer, *Bleek, Amboina*, v. p. 497.

D. 3 | 12. A. 7. P. 10.

The anterior dorsal spine is short, with cuneiform extremity. Skin rough, covered with small spines; cutaneous fringes not numerous. Red, clouded with darker, with scattered larger and smaller blackish-violet spots, one below the posterior portion of the dorsal fin being the largest. Belly densely spotted with brown. Base of the dorsal and anal fins, and the other fins nearly entirely, marbled with brown.

East Indian Seas. Red Sea.

a. Adult. Presented by Captain Sir E. Belcher, C.B.

18. **Antennarius notophthalmus.**

Bleek. Natuurk. Tydschr. Nederl. Ind. v. 1853, p. 544.

D. 3 | 12. A. 7. P. 9.

Anterior dorsal spine of moderate length, with a ciliated tentacle at its extremity. Skin rough, with short scattered tentacles. Olive-violet: body, pectoral and ventral fins reticulated with black; vertical fins with irregular oblique black streaks; dorsal with a large black, yellow-edged ocellus between the base of the eighth and eleventh rays; another superiorly on the base of the caudal. Tips of the fin-rays yellow; tentacles yellow, except those on the head, which have a black extremity. (*Bl.*)

East Indian Archipelago.

19. **Antennarius ocellatus.**

Parra, p. 1. tab. 1.
Lophius histrio, var. ocellatus, *Bl. Schn.* p. 143.
Chironectes ocellatus, *Cuv. & Val.* xii. p. 419; *Poey, Mem. Cub.* p. 219.

The anterior dorsal spine short, with the extremity cuneiform. Skin rough. Whitish; a black ocellus on the middle of the base of the dorsal, another on the body, opposite the vent; some other scattered spots on the fins.

Caribbean Sea.

This species is founded solely on the authority of Parra, none of the naturalists quoted having recognized it.

20. **Antennarius biocellatus.**

Chironectes biocellatus, *Cuv. Mém. Mus.* iii. p. 427. pl. 17. fig. 3 (bad); *Cuv. & Val.* xii. p. 417; *Bleek. Act. Soc. Sc. Indo-Nederl.* vi., *Amboina*, xi. p. 4.

D. 3 | 12. A. 7.

The anterior dorsal spine is shorter than the second, terminating in two short and slender flaps. Skin rough, with scattered short cutaneous fringes. Brown: an irregular black band descends from before the dorsal fin towards the pectoral, another from the second dorsal spine to the angle of the mouth; sides with some scattered black spots. A black ocellus on the base of the dorsal fin between the ninth and tenth rays, another near the back of the tail and the root of the caudal.

Atlantic. Amboyna.

Bleeker refers a specimen from Amboyna to this species, and describes the colours as follows:—

Red: cavity of the mouth yellow; cutaneous appendages black; black streaks radiate from the eye, three being broader than the rest: one ascends towards the neck, the second descends to the angle of the mouth, and the third proceeds backwards towards the opercular region. A blackish band, formed by confluent spots, commences below the anterior dorsal rays and extends to the middle between the eye and the base of the pectoral fin. Sides with scattered round black spots. Tail with a large round black spot superiorly; the second dorsal spine and its membrane black; the third and its membrane edged with black. The soft dorsal with a black ocellus, edged with rose-coloured and black, at the base between the eighth and tenth rays.

21. Antennarius tenebrosus.

Chironectes tenebrosus, *Poey, Mem. Cub.* p. 219. lam. 17. fig. 1.

D. 3 | 12. A. 7. P. 11.

The anterior dorsal spine is longer than the second, terminating in a simple and slender tentacle. The soft dorsal fin terminates at some distance from the caudal. Skin rough, covered with small spines, without cutaneous fringes. Blackish-brown, marbled with darker and lighter; a series of three black, blue-edged ocelli on the upper posterior part of the dorsal fin; many similar ocelli on the caudal fin, irregularly disposed. (*Poey.*)

Sea of Cuba.

22. Antennarius caudimaculatus.

Chironectes caudimaculatus, *Rüpp. N. W. Fische,* p. 141. taf. 33. fig. 2.

D. 3 | 13. A. 7. P. 10.

Skin rough. Reddish-brown, densely spotted and dotted with brown; some spots above the vent, behind the pectoral and below the dorsal, being conspicuously larger than the rest. The upper and lower margins of the caudal fin with a pair of ovate black spots. Dorsal and anal fins with dark margins. (*Rüpp.*)

Red Sea.

23. Antennarius chironectes.

Lophius chironectes, *Lacép.* i. p. 321. pl. 14. fig. 2.
Chironectes variegatus, *Cuv. & Val.* xii. p. 422.
Antennarius chironectes, (*Commers.*) *Bleek. Banda,* iii. p. 104.

D. 3 | 12. A. 7. P. 10.

Skin rough, covered with small spines; cutaneous fringes none. The anterior spine is of moderate length, with the extremity cuneiform and ciliated. Reddish, clouded with darker; five or six black ocelli on each side of the body, as many on the dorsal fin, one or two of which are on its base, whilst the others are nearer the upper margin and disposed in a longitudinal series; caudal with about sixteen ocelli, anal with seven. The ocelli on the base of the dorsal and anal fins are the largest of all; all the fins with yellow margin.

Seas of Banda Neira and Amboyna.

24. Antennarius pardalis.

Chironectes pardalis, *Cuv. & Val.* xii. p. 420. pl. 363.

The anterior dorsal spine is longer than the second, terminating in a small lobe. The soft dorsal fin terminates at some distance from the caudal. Skin rough, without cutaneous tentacles. Red, with many smaller and larger black ocelli, irregularly disposed; the largest below the middle of the base of the dorsal. (*Val.*)

Coast of Gorea.

25. Antennarius polyophthalmus.

Bleek. Natuurk. Tydschr. Nederl. Ind. iii. 1852, p. 644.

D. 3 | 12. A. 7. P. 10.

The anterior dorsal spine is longer than the second, terminating in a fringed lobe. Skin rough, covered with small spines, with a few short cutaneous fringes. Yellowish, clouded with brownish. Body and fins with black, yellow-edged ocelli, more numerous on the belly than on the back and the sides: one of the largest, with white centre, above the pectoral, another above the anal, a third on the tail. The dorsal has two series of ocelli, five forming the upper one; caudal with more than twenty; anal with ten, the basal of which is the largest. (*Bleek.*)

Seas of Banda Neira and Goram.

26. Antennarius phymatodes.

Bleek. Act. Soc. Sc. Indo-Nederl. ii., *Amboina*, p. 69.

D. 3 | 11. A. 7. P. 10.

The anterior dorsal spine is of moderate length, terminating in a fringed lobe. Skin rough, covered with small spines; a few short tentacles at the lower lip, none on the body. Citron-yellow: an oblique irregular red band descends from the anterior part of the dorsal fin towards the opercles; other red blotches on the throat, behind the angle of the mouth and on the back of the tail. Body and fins with numerous smaller and larger blackish-violet ocelli, which are very small on the back, of unequal size on the head, larger on the belly, and nearly entirely absent on the middle of the side. The larger ocelli on the fins are more or less arranged in series. (*Bleek.*)

Sea of Amboyna.

This species appears to be very nearly allied to our second variety of *A. multiocellatus*; it has been founded on a single specimen.

A. oligospilos, Bleek. Act. Soc. Sc. Indo-Nederl. ii., Amboina, p. 71, likewise founded on a single specimen, is certainly merely another variety of this or of one of the other species.

27. Antennarius leprosus.

Antennarius leprosus, *Bleek. Act. Soc. Sc. Indo-Nederl.* ii., *Amboina*, p. 68.

D. 3 | 12. A. 6. P. 10.

The anterior dorsal spine is of moderate length, terminating in two lobes. Skin rough, covered with small spines, without cutaneous fringes. Brown, with a broad red band running from the eye across the opercles towards the anterior margin of the dorsal fin; large irregular red spots on the upper and lower parts; body and fins with numerous black, red-edged ocelli; tips of the pectoral and ventral rays rose-coloured; a rose-coloured submarginal band on the dorsal fin. (*Bl.*)

Sea of Amboyna.

I am not convinced, as Dr. Bleeker seems to be, of the identity of his specimen with that described in the 'Voyage of the Bonite.' The latter is evidently a variety of *A. multiocellatus*, as is proved by the three ocelli disposed in a triangle on the caudal fin. If my opinion should prove to be correct, the question will arise, whether *A. leprosus*, Bleek., is a distinct species, or a variety of some other one. As I have not an opportunity of deciding this, I prefer, at present, not to alter the specific denomination.

28. Antennarius bigibbus.

Lophius bigibbus, *Lacép.* i. p. 325.
Chironectes tuberosus, *Cuv. Mém. Mus. Hist. Nat.* iii. 1817, p. 432; *Cuv. & Val.* xii. p. 428.
Antennarius unicornis, *Benn. Zool. Journ.* iii. p. 374. pl. 9. fig. 1.
Chironectes reticulatus, *Eyd. & Soul. Voy. Bonite, Poiss.* p. 186. pl. 5. fig. 2.
Antennarius tuberosus, *Bleek. Kokos,* v. p. 463.

D. 3 | 12. A. 7. P. 11.

The anterior dorsal spine filiform, about twice as long as the second; the third nearly entirely enveloped in skin. Skin rough, covered with minute spines, without cutaneous fringes. Red: head and anterior portion of the back immaculate, rose-coloured; body and dorsal fin reticulated with blackish-brown; pectoral, ventral, anal and caudal fins with a broad black band on the middle, and with the posterior or inferior margins black.

From Mauritius and Madagascar to New Ireland and the Sandwich Islands.

a–b. Adult and half-grown. Madagascar. From the Collection of the Zoological Society.—Types of *A. unicornis,* Benn.

29. Antennarius bougainvillii.

Chironectes bougainvillii, *Cuv. & Val.* xii. p. 431.

D. 3 | 15. A. 8.

The anterior dorsal spine is very short, somewhat swollen at the extremity; the second and third are nearly entirely hidden in the skin. Dorsal and anal fins continued to the base of the caudal. Skin naked, with some granulated lines on the head, and one along the side of the body. Reddish. (*Val.*)

Hab. —— ?

5. CHAUNAX.

Chaunax, *Lowe, Trans. Zool. Soc.* iii. p. 339.

Head very large, depressed; cleft of the mouth wide, subvertical; jaws and palate armed with cardiform teeth. Skin covered with minute spines. The spinous dorsal is reduced to a small tentacle above the snout; the soft dorsal of moderate length; anal short. Gill-opening behind the pectoral.

Sea of Madeira.

1. Chaunax pictus.

Lowe, l. c. pl. 51.

D. 1 | 11. A. 5. P. 11. V. 4. C. 8.

Rostral tentacle short, pedicellate. Muciferous channels very distinct, visible externally as chain-like rows of pits. Bright orange above, rosy on the sides; fins and lips vermilion.

Sea of Madeira.

a. Sixteen inches long: stuffed. Camera de Lobos. From the Collection of the Zoological Society.—Type of the species.

b. Fine specimen. Madeira. Purchased of Mr. Stevens.

6. MALTHE.

Malthea, *Cuv. Règne Anim.*

Anterior portion of the body very broad and depressed; forehead (nasal bones) produced into a more or less prominent process, beneath which is a tentacle retractile into a cavity. Jaws and palate with villiform teeth. Skin with many conical protuberances. Only one soft and very short dorsal fin; anal equally short. Gill-opening superiorly in the axil; gills two and a half, the anterior arcus branchialis being short and destitute of lamellæ; pseudobranchiæ none. Five branchiostegals. Air-bladder and pyloric appendages absent.

Inhabitants of the Atlantic coasts of Tropical and Northern America, living on Mollusca.

1. Malthe vespertilio.

Guacucuja, *Marcgr.* p. 143; *Willughb.* ii. E. fig. 3; *Ray, Syn.* p. 30.
Diablo, *Parra*, p. 5. lam. 4.
Guaperva, *Brown, Hist. Nat. Jam.* p. 457. pl. 48. fig. 3.
Seba, i. 74. 2.
Lophius, sp. no. 2, *Artedi, Syn.* p. 88; *Gronov. Zoophyl.* no. 209, and *Mus. Ichthyol.* i. p. 58. no. 129.
Sea-Bat, *Edwards, Glean.* pl. 283.
Nicholson, Hist. Nat. St. Domingo, pp. 347, 348. pl. 7. fig. 3.
Lophius vespertilio, *L. Syst. Nat.* i. p. 402; *Bl.* tab. 110; *Bl. Schn.* p. 140; *Lacép.* i. pp. 302, 315; *Gronov. Syst. ed. Gray*, p. 48.
Batrachus, no. 9, *Klein, Miss. Pisc.* iii. p. 17.
Chauve-souris de mer, *Duham.* iii. sect. 9. pl. 16. figs. 1, 2 (bad).
Lophius rostratus, *Shaw, Zool.* v. p. 383. pl. 163.
Malthea vespertilio, *Cuv. & Val.* xii. p. 440; *Cuv. Règne Anim. Ill. Poiss.* pl. 85. fig. 2; *Dekay, New York Fauna, Fishes*, p. 167.

Malthea longirostris, *Cuv. & Val.* xii. p. 450. pl. 365.
—— nasuta, *Cuv. & Val.* xii. p. 452 (not M. cubifrons, *Richards.*).
—— notata, *Cuv. & Val.* xii. p. 453, cop. by *Dekay, l. c.*; *Casteln. Anim. nouv. Amér. Sud, Poiss.* p. 26. pl. 12. fig. 4.
—— angusta, *Cuv. & Val.* xii. p. 454.
? Malthea truncata, *Cuv. & Val.* xii. p. 454.
Malthea guacucuja, *Casteln. l. c.*
Skeleton: *Rosenth. Ichthyot. Taf.* pl. 19. fig. 2 (Lophius histrio).

D. 4. A. 4. V. 1/5. Vert. 19.

The distance between the anterior angles of the orbit is much less than that between the hinder ones. Forehead produced into a more or less elongate subconical process; the groove for the rostral tentacle is higher than broad.

Atlantic coasts of Tropical America, extending northwards to the latitudes of Newfoundland.

The snout varies in length; it is—

α, one-sixth of the total length: *Malthea longirostris*, C. & V.

a. Fine specimen. Para. Presented by J. P. G. Smith, Esq.
b. Skeleton. Para. Presented by J. P. G. Smith, Esq.

β, one-seventh.

c–f. Adult and half-grown: stuffed.
g. Half-grown: in spirits.

γ, one-eighth.

h. Adult. Brazil.
i. Half-grown. From the Collection of the Zoological Society.
k–p. Adult and half-grown: stuffed.

δ, one-ninth or one-tenth: *Malthea vespertilio*, C. & V.

q, r. Half-grown: stuffed.
s–x. Adult and half-grown: stuffed.—One of these specimens is somewhat more spiny than the others, each of the conical tubercles having a cluster of small spines at the top.

ε, one-thirteenth: *Malthea nasuta*, C. & V.

y, z. Adult: stuffed. Caribbean Sea.
α. Young. Demerara. Purchased of Mr. Snellgrove: *Malthea notata*, C. & V.

ζ, one-eighteenth.

β, γ. Adult.

η, one-twentieth to one-twenty-fifth: *Malthea angusta*, C. & V.

δ. Adult: stuffed.
ε, ζ. Half-grown. Brazil.

Skeleton.—The bones are rather soft, light, striated—an inconsiderable quantity of calcareous matter being deposited in them. The cranial and facial portions of the skull are not of great extent, the breadth of the head being caused by the great development and prolongation of the opercles and of the humeral arch. The skull proper is rather elevated and of moderate length; the crown of the head convex, with a longitudinal median groove, which is widened anteriorly and posteriorly; there is no trace of an occipital crest.

Having for examination a skeleton with the rostral process well developed, I find the following structure of this part of the skull, differing therein from the account given by Valenciennes:—The principal frontal bones advance to before the orbit, their extremities being united to the præfrontals, which have a subvertical position, forming the anterior portion of the orbit. The two principal frontal bones and the two præfrontals coalesce at their extremities into one point, which in the short-snouted specimens forms a portion of the front part of the snout; they leave between them a tunnel-like space, in which the rostral tentacle and the processes of the intermaxillaries move. Bony tubercles surround the point in which the frontal bones meet, forming a swelling, in which is inserted the base of the rostral process: we consider this process, which is a bone by itself, as the united *turbinal* bones. The præorbital and the other suborbital bones are absent. The maxillary bone is not dilated; it is received in a shallow groove formed by a ridge on the posterior part of the mandible. The intermaxillary is not much shorter than the maxillary, and dilated posteriorly into a curved process; its articulary processes are long. The head of the vomer is broad, flat, armed with a broad subquadrangular patch of villiform teeth; a smaller patch belonging to the palatine bone is contiguous with the former. The hyoid bones are covered with a large patch of villiform teeth, extending backwards to the lower pharyngeals.

The base of the cranium is rather compressed.

The præoperculum does not extend forwards to the mandible. The interoperculum is long, styliform, ascending obliquely backwards, and swollen behind the præoperculum into a broad knob, which corresponds to a notch of the suboperculum. The operculum is elongate, branching off posteriorly into two lobes. The suboperculum is the largest of all the opercular pieces and composed of three parts: the anterior meets the interoperculum, is narrow and swollen at its front extremity; the posterior is lanceolate, forming the hindmost portion of the skull; and, finally, the middle is rhomboidal, situated behind the operculum, between the lobes of which it is received.

The structure of the humeral arch is very simple; I can distinguish only three bones: a furcula-like humerus, the branches of which are long and styliform, the upper being joined to the occiput, without distinct scapula between; secondly, a strong curved coracoid; and thirdly, a slender bone below the coracoid joint, which is a rudiment of a fore-arm. The carpus is reduced to two elongate bones, with a free interspace between them, the inner being the larger. The pubic bone is composed of three processes: the longest and broadest for the base of the fin, the shortest for the union with the other pubic bone, and a third slender one for the attachment to the humerus.

There are nineteen *vertebræ*, eight of which appear to belong to the abdominal portion; they are compressed, the anterior and posterior being rather elongate. The neural spines of the abdominal vertebræ are confluent into a crest; the neurals and hæmals of the caudal vertebræ are compressed, short, inclining backwards. Ribs none.

	lines.
Length of the first eight vertebræ	24⅓
——— of the last eleven vertebræ	33½
——— of the first vertebra	1⅓
——— of the second vertebra..............	2⅓
——— of the third vertebra	3⅓
——— of the fifth vertebra	4
——— of the eighth vertebra	2½
——— of the fifteenth vertebra............	2½
——— of the eighteenth vertebra	2⅓
——— of the nineteenth vertebra	6⅓

2. Malthe cubifrons.

Malthe cubifrons, *Richards. Faun. Bor. Amer. Fishes*, p. 103. pl. 96, cop. by *Dekay, New York Fauna, Fishes*, pl. 28. fig. 89 (as Malthea nasuta).

D. 4. A. 4. C. 9. V. 1/5. P. 11.

The distance between the anterior angles of the orbit nearly equals that between the posterior; a small round button-like tubercle on the forehead; the groove for the rostral tentacle is much broader than high.

Coast of Labrador.

a. Type of the species. Labrador. From the Haslar Collection.

7. HALIEUTÆA.

Halieutæa, *Cuv. & Val.* xii. p. 455.

Head exceedingly large, broad, depressed, its profile being nearly circular; cleft of the mouth wide, horizontal. Jaws with small cardiform teeth; palate smooth. Forehead with a transverse bony bridge, beneath which is a tentacle retractile into a cavity. Body and head covered with small spines. Only one soft and short dorsal fin; anal equally short. Gill-openings on the upper part of the axil; branchiostegals five; gills two and a half, the anterior arcus branchialis not having any laminæ.

Seas of China and Japan.

1. Halieutæa stellata.

Lophius stellatus, *Wahl, Skr. Naturh. Kjöbenh.* iv. p. 214. tab. 3. figs. 3, 4; *Bl. Schn.* p. 142.
—— faujas, *Lacép.* i. p. 318.
—— muricatus, *Shaw, Zool.* v. p. 382. pl. 162.
Tiles. Krusenst. Reise, taf. 61. figs. 3, 4.

Halieutæa stellata, *Cuv. & Val.* xii. p. 456. pl. 366; *Faun. Japon. Poiss.* p. 160. pl. 72; *Bleek. Amb. & Cer.* p. 279.

B. 5. D. 4. A. 4. C. 9. P. 13. V. 1/5. Vert. 7/10.

Base of each spine with four or more radiating ridges. Uniform rose-coloured.

Seas of China and Japan.

a. Adult. Purchased of Mr. Frank.
b–c. Half-grown. From the Collection of the Zoological Society.
d. Young. China. Presented by Captain Sir E. Belcher, C.B.
e. A great number of dried specimens. From Chinese insect-boxes.
f. Skeleton. Presented by Dr. Albert Günther.

Skeleton.—From an examination of the skeleton, it becomes very evident that *Halieutæa* is most closely allied to *Malthe*, both genera representing each other in different regions. The general arrangement of the bones is the same, except that they are somewhat more ossified in *Halieutæa*—large portions of them, however, remaining very thin and membranaceous. The cranial and facial portions of the skull are not of much extent, the great width of the head being caused by the development of the opercles and of the humeral arch. The skull proper is depressed and of moderate length. The crown of the head is flat, broad, subpentagonal, with two low ridges which are convergent posteriorly. The orbital edges are much elevated, the space between them being a deep groove, in which the bony portion of the rostral tentacle (dorsal spine) is situated; anteriorly the two ridges are united, forming a bridge, below which the tentacle moves: the whole of these orbital ridges are armed with erect spines.

The jaw-bones are feeble: the maxillary is not dilated, and extends as far backwards as the intermaxillary; the intermaxillary has long articulary processes, and another slender process arises from the middle of its body; the arch formed by the two mandibles is nearly semicircular. Head of the vomer very broad and flat; base of the cranium rather convex.

A series of strong bones forms the lateral margin of the head, and extends from the forehead to the carpal bones. The whole of this bony ring is covered with spines, either firmly adherent to the bones or loosely attached to them; it is formed by the præfrontal, præorbital, interoperculum, part of suboperculum, and, finally, by two or three dermal bones intercalated between the suboperculum and the carpus. This union of the interoperculum with the præorbital is very singular, and unique in this order of fishes. A little before the suture between the inter- and suboperculum, the præoperculum is joined to the former; it is the smallest of all the opercular pieces, and its limbs meet at a somewhat acute angle. The suboperculum is composed of two portions: the lower is thick, joined to the interoperculum, and forms the base for the upper portion, which is large, subrhombic, lamelliform. The operculum is composed of two styliform branches meeting at an acute angle, and leaving between them a space filled up by a membrane; the upper branch is fixed to the superior end of the subopercular plate, the lower to its inferior. Glosso- and uro-hyals absent; branchiostegals five, very long and filiform; the outer one is divided into two branches, and may easily be taken for two.

The structure of the humeral arch and of the pubic bones is entirely the same as in *Malthe.*

There are seventeen *vertebræ,* seven of which belong to the abdominal portion, and are much more elongate than those of the caudal portion, except the last, which is the longest, and provided with a prominent triangular lateral crest. The neural spines of the abdominal vertebræ are confluent into a crest; the neurals and hæmals of the caudal vertebræ are short, compressed, inclining backwards. Ribs none.

	lines.
Length of the first vertebra	$1\frac{2}{3}$
——— of the second vertebra	$2\frac{1}{3}$
——— of the fourth vertebra	3
——— of the sixth vertebra	$2\frac{1}{3}$
——— of the seventh vertebra	$1\frac{2}{3}$
——— of the twelfth vertebra	$1\frac{1}{3}$
——— of the sixteenth vertebra	$1\frac{1}{2}$
——— of the seventeenth vertebra	$4\frac{1}{2}$
——— of the abdominal portion	$16\frac{1}{2}$
——— of the caudal portion	17

8. CERATIAS.

Ceratias, *Kröyer, Naturhist. Tidskr.* 1844, i. p. 639.

Head and body much compressed and elevated; cleft of the mouth rather wide, subvertical. Teeth of the jaws of moderate size, conical, moveable; palate toothless. Skin covered with numerous prickles. The spinous dorsal fin is reduced to two long isolated spines, the one on the middle of the head, the other on the back. The soft dorsal and anal short. Ventrals none; pectorals very short. Gill-opening rather wide, below the pectoral; branchiostegals six; three gills, the third united with the pharynx; air-bladder none. Pyloric appendages two, small. Skeleton soft, fibrous.

Coast of Greenland.

1. Ceratias holbölli.

Kröyer, l. c.; *Gaimard, Voy. Scand. Poiss.* pl. 9.

D. 1 | 1 | 4. A. 4. C. 8. P. 19.

Entirely black. Caudal fin very long, lanceolate; the membrane behind the dorsal and anal fins extends nearly to the base of the caudal.

Coast of Greenland.

Fam. 24. BLENNIIDÆ.

Gobioidei, part., *Cuv. Règne Anim.*
Blennioidei, *Müll. Berl. Abhandl.* 1844, p. 201.
Blenniidæ, *Owen, Lect. on Comp. Anat. Vert.* i. p. 49.

Body elongate, low, more or less cylindrical, naked, or covered with scales, which are generally small. The infraorbital ring does not articulate with the præoperculum. One, two, or three dorsal fins, occupying nearly the whole of the back,—the spinous portion, if distinct, being as much developed as the soft, or more; sometimes the whole fin composed of spines; anal fin long; ventrals jugular*, composed of a few rays, and sometimes rudimentary or entirely absent. Air-bladder generally absent; pyloric appendages none. Pseudobranchiæ present†.

Carnivorous fishes, living at the bottom of the shores of all regions; several inhabiting fresh waters.

Müller has directed the attention of ichthyologists to the presence or absence of pseudobranchiæ as an excellent character by which the position of these fishes may be determined, in which otherwise it is not evident whether they belong to the Blenniidæ or to the Anacanthini. This character, however, appears not to be sufficient, *Dactyloscopus* and *Patæcus* forming exceptions, although the structure of their dorsal fin proves that their natural place is with, or near, the Blennioids.

Synopsis of the Genera.

A. *Ventrals jugular, if present.*

1. *Molar teeth.*

Caudal separate	1. ANARRHICHAS, p. 208.
Caudal not separate	2. ANARRHICHTHYS, p. 211.

2. *Molar teeth none. Caudal distinct.*

a. The spinous and soft portions of the dorsal fin of nearly equal extent.

Body naked. Jaws with a single series of immoveable teeth, and sometimes with a small posterior canine tooth. Gill-opening wide	3. BLENNIUS, p. 211.
Body naked. Jaws with a single series of immoveable teeth, and sometimes with a small posterior canine tooth. Gill-opening reduced to a small opening above the pectoral	4. CHASMODES, p. 228.
Body naked. Jaws with a single series of immoveable teeth and with a long posterior canine tooth. Gill-opening reduced to a small opening above the pectoral	5. PETROSCIRTES, p. 229.

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* Thoracic in *Pseudoblennius.*
† Except in *Dactyloscopus* and *Patæcus.*

Jaws with a series of numerous small moveable teeth, implanted in the gum	6. Salarias, p. 239.
Each jaw with four hook-like teeth near the symphysis	7. Blennophis, p. 259.
The maxillary extending beyond the gill-opening	8. Neoclinus, p. 259.
Ventrals none	9. Cebidichthys, p. 260.

b. Dorsal fin or fins chiefly composed of spines, with a few posterior rays.

A single dorsal fin; ventral fins. Jaws with a series of small teeth; palate smooth	10. Myxodes, p. 260.
A single dorsal fin. Teeth in the jaws, on the vomer and the palatine bones. Snout elongate, depressed	11. Heterostichus, p. 261.
A single dorsal fin. Jaws and palate with a narrow band or a single series of small teeth. Snout rather short.	12. Clinus, p. 261.
Dorsal fin anteriorly with a detached three-spined portion	13. Cristiceps, p. 272.
Three dorsal fins, the two anterior of which are spinous	15. Tripterygium, p. 276.
Ventrals none	17. Dictyosoma, p. 279.

c. Dorsal fin formed by spines only.

Two dorsal fins	14. Auchenopterus, p. 275.
Ventral fins. Scales large	16. Dactyloscopus, p. 279.
Ventral fins scarcely before the pectorals. Lower jaw with a short skinny appendage	18. Gunellichthys, p. 280.
Ventral fins distinctly jugular; gill-membranes only slightly united at the throat	19. Stichæus, p. 280.
Ventral fins composed of several rays, distinctly jugular. Scales small; lateral line none. Anal spine none. Gill-membranes united below the throat	20. Blenniops, p. 284.
Ventral fins none or rudimentary. Scales small; lateral line none. Anal spine none. Gill-membranes united below the throat	21. Centronotus, p. 285.
A large excavated spine before the anal fin	22. Apodichthys, p. 290.
Ventral fins none; body naked or with rudimentary scales; several lateral lines	23. Xiphidion, p. 291.
Ventral fins none; muciferous channels of the head well developed; anterior dorsal spines feeble	24. Cryptacanthodes, p. 291.
Ventral fins none; anterior dorsal spines very strong	25. Patæcus, p. 292.
Ventral fins scarcely before the pectorals; body naked	26. Pholidichthys, p. 293.

d. No distinct spines in the vertical fins.

Upper lip with a lateral flap	27. Andamia, p. 294.
Ventral fins below the eyes	28. Genypterus, p. 294.

3. *Molar teeth none. Caudal fin none.*

Dorsal fin with a short depressed part on the tail, which is formed by spines	29. Zoarces, p. 295.
Ventral fins none	30. Nemophis, p. 296.

B. *Ventrals thoracic.*

Two dorsal fins	31. Pseudoblennius, p. 297.

1. ANARRHICHAS.

Anarrhichas, *Artedi, Genera*, p. 23.

Body elongate, with the scales rudimentary; snout rather short; cleft of the mouth wide; strong conical teeth in the jaws, those on the sides with several pointed tubercles; a biserial band of molars on the palate. Dorsal fin long, with the spines flexible; caudal separate; ventrals none. Gill-openings wide; pseudobranchiæ present; branchiostegals seven; air-bladder and pyloric appendages absent.

Northern parts of the temperate seas of the northern hemisphere.

1. Anarrhichas lupus.

Anarrhichas (Scansor), *Gesner, Nomencl. Aquat. Animant.* p. 116, and *Paralip.* p. 4; *Artedi, Gen.* p. 23; *Olear. Gottorff. Kunstkammer*, taf. 27. fig. 2; *Gronov. Zoophyl.* n. 400, and *Mus. Ichthyol.* n. 44.
Lupus marinus, *Schoner.* p. 45. tab. 5; *Jonston*, tab. 47. fig. 2; *Willughby*, p. 130. tab. H. 3. fig. 1; *Ray*, p. 40.
Anarrhichas lupus, *L. Syst.* i. p. 430; *Olavii Reise*, i. p. 80; *Retz. Faun. Suec.* p. 315; *Fabr. Faun. Grönl.* p. 138. n. 97; *Mohr, Isl. Natur. Hist.* p. 63. n. 114; *André, Phil. Trans.* 1784, p. 274. tab. 11; *Brouss. Mém. Acad. Sc.* 1785, p. 161. pl. 3; *Müll. Prodr. Zool. Dan.* p. 40; *L. Gm.* i. p. 1142; *Bl. Fische Deutschl.* iii. p. 25. taf. 74; *Bl. Schn.* p. 495; *Lacép.* ii. pp. 299, 300. pl. 9. fig. 2; *Low, Faun. Orcad.* p. 187; *Cuv. Règne Anim.*; *Faber, Fische Isl.* p. 70; *Donov. Brit. Fishes*, i. p. 24; *Turton, Brit. Faun.* p. 87; *Flem. Brit. Anim.* p. 208; *Fries och Ekstr. Skand. Fisk.* p. 23. tab. 8. fig. 2; *Richards. Faun. Bor. Amer.* p. 95; *Jen. Man.* p. 384; *Yarrell, Brit. Fishes*, 1st edit. i. p. 247, 2nd edit. i. p. 277, 3rd edit. ii. p. 384; *Parn. Wern. Mem.* vii. p. 339; *Cuv. & Val.* xii. p. 473. pl. 341; *Cuv. Règne Anim. Ill. Poiss.* pl. 79. fig. 2; *Gaim. Voy. Isl. et Groenl. Zool. Poiss.* pl. 4; *Gronov. Syst. ed. Gray*, p. 188; *Gaimard, Voy. Scand. et Lapon. Zool. Poiss.* pl. 12. fig. 2; *Dekay, New York Fauna, Fishes*, p. 158. pl. 16. fig. 43; *Nilss. Skand. Faun.* iv. p. 208.
Latargus, *Klein, Pisc. Miss.* iv. p. 16.
Anarhichas non maculatus, *Olafs. Islænd. Reise*, § 683 *a*.
—— minor, *Olafs. Islænd. Reise*, § 683 *b*. tab. 42; *Müll. Prodr. Zool. Dan.* p. 40; *Fabr. Faun. Grönl.* p. 139. n. 97 *b*; *Mohr, Isl. Natur. Hist.* p. 64. n. 115; *L. Gm.* i. p. 1143; *Bl. Schn.* p. 496.
Ascan. Icon. tab. 25.
Steenbider, *Pontopp. Norg. Nat. Hist.* ii. p. 243 (bad); *Ström, Söndm.* i. p. 310.
Ravenous Wolf-fish, *Penn. Brit. Zool.* iii. p. 133. pl. 24, and edit. 1812, iii. p. 201. pl. 27.
Anarrhichas strigosus, *L. Gm.* i. p. 1144.
—— pantherinus, *Zouiew, N. Act. Petrop.* 1781, p. 271. tab. *b*; *L. Gm.* i. p. 1144; *Bl. Schn.* p. 495. tab. 92; *Lacép.* ii. pp. 299, 309, 310.
Cat-fish, *Sibbald, Scotia Ill.* iii. p. 25. tab. 16.
Anarrhichas maculatus, *Bl. Schn.* p. 496.
—— karrak, *Lacép.* ii. pp. 299, 307.
—— leopardus, *Agass. in Spix, Pisc. Bras.* p. 92. tab. 51 (artificially deformed); *Cuv. & Val.* xi. p. 493.
Skeleton: *Owen, Osteolog. Catal. Fishes*, p. 72.

D. 75. A. 46. Vert. 26/50.

Teeth of the jaws very strong; the greatest height of the dorsal is about one-third of the greatest depth of the body. Body with brown spots or cross-bars.

Temperate coasts of the northern parts of Europe and of North America.

α. *European variety*: Back with brown cross-bars on the back, spot-like in immature specimens.

a–c. Adult and half-grown: stuffed and skin. Frith of Forth.
d, e. Large specimens: stuffed. English coast.
f. Fine specimen.
g, h. Fine specimens: skins. From Mr. Yarrell's Collection.
i. Dried half of a head of a large specimen.
k. Half-grown: skin. From Gronow's Collection.
l. Skull: injured.
m. Adult: skeleton. English coast.

β. *American variety*: Back and sides with numerous round brown spots (*A. pantherinus, maculatus, leopardus*).

n–p. Large specimens: stuffed and skins. Greenland.

Skeleton.—The skull of *Anarrhichas* is similar in form to that of a *Blennius*; it is elevated, compressed, especially in its parietal and sphenoidal portions; all the bones are very solid.

The *intermaxillary* is short and high, vertically situated, and joined to the nasal by a broad articular surface; the vertical portion of the bone is armed with two large canine teeth, behind which are three or four smaller ones; the horizontal portion of the bone is small, like a process, and bears a series of two or three small subconical teeth, which are lost with age. The *maxillary* is long, sword-shaped, slightly bent, and somewhat dilated at its posterior extremity. The *nasal* bone (Owen) (ethmoid, Cuvier) forms a part of the upper surface of the skull; it has two large and slightly concave planes anteriorly for the articulation with the intermaxillaries; each of the planes is provided with a small foramen, situated inwards from the centre, and sometimes closed. The *prefrontal* is very large and thick; it forms entirely the anterior portion of the orbit, and is joined by sutures to the principal frontal bones, to the nasal and vomer; it is pierced by a wide round foramen near the nasal bone, through which the *nervus olfactorius* passes. The *vomer* is extremely thick and solid, bearing two series of large molars, ten or twelve in number; they occupy the whole of the inferior surface of the bone; the articular planes of the nasal bone extend also on the anterior part of the vomer. The *palatine* bone is rather short in its longitudinal diameter; it has a deep articular cavity for the junction with the prefrontal, and an oblique process before that cavity; two series of conical or molar-like teeth occupy its inferior surface. The *pterygoid* and *entopterygoid* are nearly straight, entirely bony, and slightly dilated posteriorly.

The four *tympanic* bones can easily be distinguished, and do not show any peculiarities; they are joined together by an intermediate cartilaginous substance. The *præoperculum* is crescent-shaped, vertically situated, rather broader superiorly than inferiorly; it has no prominent ridges; several foramina lead from the posterior margin into the interior of the bone. The *operculum* is triangular, thin, fragile, irregularly striated; it terminates in a stout and erect process superiorly. *Sub-* and *interoperculum* narrow. In the *mandibula* only the dentary and articular bones can be distinguished; both are very stout, entirely bony, and do not leave a free space between them. The anterior portion of the former is armed with two strong, somewhat diverging canines, behind which are two smaller ones; the lateral portion bears exceedingly strong molar teeth, disposed in two series on the middle of the bone and in a single one posteriorly. The entire upper and lower margins of the mandible are formed by the dentary, and the inferior branch has a distinct muciferous channel, into which run four or five foramina. The outer surface of the mandible is convex, whilst there is a deep triangular cavity on the internal surface.

We can distinguish three portions in the *frontal* bones:—The interorbital portion is not quite three times as long as broad, flat superiorly, but with many smaller and larger pores, a rather deep groove between the orbits, and a pair of wide apertures at the anterior extremity of the bones. The second (middle) portion is the broadest, and distinguished by a large protuberance on each side, to which the infraorbital ring is suspended. The posterior portion is compressed to a sharp edge, which however does not project above the level of the crown of the head. No bony ethmoid separates the two orbits from each other. The *infraorbital* ring is complete, and composed of five very irregularly-shaped bones, the anterior of which is the largest and the posterior the smallest.

The *basisphenoid* is extremely large and broad, and is compressed into a sharp inferior edge. The *alisphenoid* is subquadrangular, with several low ridges radiating from the foramen, through which the nerves pass. The *postfrontal* is vertically situated, and distinguished by a sharp prominent crest above the articular cavity for the tympanic bones. The *mastoid* is immediately behind the postfrontal; it extends upwards to the crest of the frontal bones, forms another crest together with the parietal on each side of the occiput, and a very deep conical cavity together with the parietal and paroccipital. The *parietal* is one of the smaller bones of the head, and forms a part of the posterior region of the skull, which is slightly impressed and descends obliquely backwards.

The *occipital* bones are very distinctly separated from each other. The interior of the basioccipital appears to be very porous. The exoccipitals are, as usual, provided with a joint for the first vertebra. The paroccipital is laterally produced into a large prominence; and the supraoccipital has a slight longitudinal crest.

The vertebral column is composed of twenty-six abdominal and forty-nine or fifty caudal *vertebræ*, the length of the former portion being to that of the latter as 1 : 1·7. The first vertebra is very compressed, like a disk; the neural and hæmal spines are well developed, and the latter of the first caudal vertebra form a complete ring.

2. Anarrhichas denticulatus.

Anarrhichas denticulatus, *(Kröyer) Gaimard, Voy. en Scand. et Lapon. Zool. Poiss.* pl. 12. fig. 1 (without descript.).

D. 80. A. 47

Teeth of the jaws and vomer comparatively feeble. Dorsal spines very feeble; the greatest depth of the dorsal fin is on its posterior part, where it is contained four times and a half in the greatest depth of the body. Body uniform blackish-brown.

Greenland.

a. Large specimen: stuffed. Greenland.

2. ANARRHICHTHYS.

Anarrhichthys, *Ayres in Proc. Calif. Acad. Nat. Sc.* i. 1855, p. 32.

Body very elongated and tænioid, with the scales rudimentary; snout rather short, cleft of the mouth wide; strong conical teeth in the jaws, those on the sides being molars; a biserial band of molars on the palatine bones and on the vomer. Dorsal fin long, with the spines flexible; no separate caudal; ventrals none. Gill-membranes separated at the throat by an isthmus; branchiostegals seven.

Coast of California.

1. Anarrhichthys felis.

Anarrhichas felis, *Girard in Proc. Acad. Nat. Sc. Philad.* 1854, p. 150.
Anarrhichthys ocellatus, *Ayres, l. c.* p. 31.
—— felis, *Girard in U. S. Pacif. R. R. Exped. Fishes,* p. 125 (pl. 25 *a*. figs. 1–3).

Caudal fin lanceolate. Grey, with irregular darker spots and ocelli.

Coast of California.

a. Skull: injured. California. Presented by J. H. Gurney, Esq., M.P. —The chief difference from *Anarrhichas lupus* consists in the arrangement of the mandibulary molars: they are extremely strong, disposed in a single series on the anterior half of the jaw, and in a double one on the posterior; the two hindmost teeth, again, are single. The infraorbital ring is composed of six bones; there is no groove on the middle of the interorbital space, and no crest on the supraoccipital. The angular bone of the mandibula is more distinct than is observed in adult specimens of *Anarrhichas lupus*, but this may vary in different individuals.

3. BLENNIUS*.

Blennius, *Artedi, Genera,* p. 26.
Blennius et Pholis, *Cuv. & Val.* xi. pp. 197, 268.

Body moderately elongate, naked; snout short. A single dorsal, without detached portion; ventrals jugular, formed by a spine and two rays. Cleft of the mouth narrow; a single series of immoveable teeth in the jaws, generally a curved tooth behind this series in both jaws or in the lower. Tentacle above the orbit more or less developed, sometimes absent. Gill-opening wide. Branchiostegals six; pseudobranchiæ present; air-bladder and pyloric appendages none.

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* 1. Blennius ruber, *Cuv. & Val.* xi. p. 211.—Atlantic.
2. —— inæqualis, *Cuv. & Val.* xi. p. 230; *Guichen. Explor. Algér. Poiss.* p. 71. pl. 4. fig. 3.—Mediterranean. 3.

Coasts of Europe. Freshwater lakes of Italy. Shores of the Atlantic. Red Sea. Sandwich Islands. Van Diemen's Land.

1. Blennius gattorugine.

Gattorugine, *Willughby*, p. 132. tab. H. 2. fig. 2; *Ray*, p. 72; ?*Penn. Brit. Zool.* iii. p. 181. pl. 35. n. 91.
Blennius, sp. n. 2, *Artedi, Genera*, p. 26; ?*Klein, Pisc. Miss.* v. p. 32. tab. 7. fig. 1.
? Blennius gattorugine, *Bl.* taf. 167. fig. 2; *Bl. Schn.* p. 168.
Blennius gattorugine, *Brünn. Pisc. Mass.* p. 27; *Donov. Brit. Fishes*, iv. pl. 86; *Lacép.* ii. p. 468; *Martens, Reise nach Venedig*, ii. p. 418; *Risso, Ichth. Nice*, p. 127, and *Eur. Mérid.* iii. p. 230; *Cuv. & Val.* xi. p. 200; *Yarrell, Brit. Fishes*, 2nd edit. i. p. 256; *Guichen. Explor. Algér. Poiss.* p. 69; *Lowe in Trans. Zool. Soc.* iii. p. 9.
—— varus, *Pall. Zoogr. Ross.* iii. p. 170; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 402 (not *Risso*).

B. 6. D. $\frac{13}{19-20}$. A. 21–22. Vert. 12/27.

The height of the body equals the length of the head, and is four times and a half to five times in the total. Snout obtuse, with the upper profile abruptly descending. No curved tooth in the upper jaw, and a very small one in the lower. Orbital tentacle well developed; the interorbital space is concave, and its width is less than the vertical diameter of the eye; a transverse groove behind the tentacles. The dorsal fin commences in the vertical from the præopercular margin and has stiff spines, which are a little flexible at the top; a shallow

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3. Blennius frater, *Asso. Introd. Oryctogr. Arrag.* p. 95. tab. 6. fig. 2; *Bl. Schn.* p. 171; *Cuv. & Val.* xi. p. 252; *Martens in Wiegm. Arch.* xxiii. p. 176.—River Po.
4. —— goreensis, *Cuv. & Val.* xi. p. 255.—Coast of Gorea.
5. —— oceanicus, *Cuv. & Val.* xi. p. 265.—Atlantic.
6. —— multifilis, *Girard in Proc. Acad. Nat. Sc. Philad.* 1858, p. 169.—St. Joseph's Island, Texas.
7. Pholis carolinus, *Cuv. & Val.* xi. p. 276.—Carolina.
8. —— parvidens, *Cuv. & Val.* xi. p. 277.—*Hab.* ——?
9. Blennius tentacularis, *Risso, Ichthyol. Nice*, p. 130, and *Eur. Mérid.* iii. p. 230.—Mediterranean.
10. —— cornu cervi, *Risso, Eur. Mérid.* iii. p. 231.—Mediterranean.
11. —— stellatus, *Risso, Eur. Mérid.* iii. p. 233, and *Ichthyol. Nice*, p. 134. —Mediterranean.
12. —— galerita, *Risso, Ichthyol. Nice*, p. 132, and *Eur. Mérid.* iii. p. 235.—Mediterranean (not *auct.*).
13. —— lineatus, *Guichen. Explor. Algér. Poiss.* p. 73. pl. 4. fig. 2.—Coast of Algiers.
14. —— hentzii, *Lesueur, Journ. Acad. Nat. Sc. Philad.* iv. p. 363.—Charleston.
15. —— (?) aurosplendidus, *Richards. Ichthyol. China*, p. 265.—Macao.
16. —— (?) fasciolatoceps, *Richards. Ichthyol. China*, p. 265.—Macao.

notch between the spinous and soft portions, the latter being continuous with the caudal. Light brown, with more or less regular darker cross-bars, or irregularly spotted with dark brown, sometimes uniform brown or blackish-brown; a blackish spot between the third and fourth dorsal spines.

Mediterranean. Atlantic coasts of Europe.

a–c. Adult: stuffed. Frith of Forth.
d. Nine inches and a half long: stuffed. Coast of Cornwall.
e. Adult: skin. Torquay. From Mr. Yarrell's Collection.
f. Adult: skin. Brixham. From Mr. Yarrell's Collection.
g. Half-grown. South Devonshire. From the Leach Museum.
h. Fine specimen. Coast of Ireland. Presented by the Earl of Enniskillen.
i. Adult. Dalmatia.
k. Adult. Mediterranean.
l. Half-grown: bad state.
m. Half-grown. From the Haslar Collection.
n–q. Half-grown: skins and stuffed.
r. Adult female: skeleton. From the Haslar Collection.
s. Adult female: skeleton. Purchased.

Skeleton.—The bones are well ossified and very solid; the tympanic groove is nearly entirely osseous. The skull is elevated; the crown of the head compressed into a short ridge bifurcating posteriorly, so that its upper surface is formed by three planes, one posterior and two lateral. The intermaxillaries and the mandibles are very strong and broad, to afford a solid base for the teeth, which are rather strong. The infraorbital ring is firm; no sutures can be distinguished between the single bones. Suprascapula distinct; humerus with a transverse ridge terminating in a short prominence in its lower portion. Coracoid long, well developed. I am unable to distinguish either the radius or the ulna; they appear to be united with the humerus, without leaving sutures between them. Carpal bones four, the lower of which is the longest and broadest.

There are twelve abdominal and twenty-seven caudal *vertebræ*, the length of the former portion being to that of the latter as 1 : 1·7; the vertebræ are compressed, as high as long; neural and hæmal spines of moderate length and strength; one interneural and one interhæmal correspond to one neural and hæmal; ribs feeble, long, with slender epipleurals.

2. Blennius cornutus.

Blennius, sp., *Gronov. Zoophyl.* n. 264.
—— cornutus, *L. Amœn. Acad.* i. p. 316, and *Mus. Ad. Fried.* p. 61; *Bl. Schn.* p. 169; *Gronov. Syst. ed. Gray*, p. 95.
—— grandicornis, *Cuv. & Val.* xi. p. 258.

D. $\frac{12}{18}$. A. 23.

The height of the body equals the length of the head, and is contained four times and two-thirds in the total. Snout obtuse, with the upper profile abruptly descending. A curved tooth in the lower jaw and a very small one in the upper. Orbital tentacle well developed. The dorsal fin commences in the vertical from the præopercular margin and has flexible spines; a very distinct notch between the spinous and soft portions; the latter not continuous with the caudal. Uniform dark brown (in a preserved state).

South coast of Africa.

a. Adult: skin. From Gronow's Collection.

3. Blennius tasmanianus.

Richards. Trans. Zool. Soc. iii. p. 129.

$\mathrm{D.}\,\frac{12}{17}.\quad \mathrm{A.}\,2+19.$

The height of the body is contained four times and two-thirds in the total length, the length of the head four times. Snout obtuse, with the anterior profile abruptly descending. A curved tooth in each of the jaws. Orbital tentacle well developed, posteriorly fringed; a small tentacle at the nostril. The width of the interorbital space is less than the vertical diameter of the eye; a transverse groove behind the tentacles. The dorsal fin commences in the vertical from the præopercular margin and has flexible spines; a distinct notch between the spinous and soft portions, the latter being separate from the caudal. Brownish-grey dotted with brown; head and vertical fins blackish.

Coast of Van Diemen's Land.

a. Adult. Van Diemen's Land. From the Haslar Collection.—Type of the species. The orbital tentacles shrunk.

b, *c–i*, *k*, *l–p*, *q–x*. Adult, half-grown, and young. Van Diemen's Land.

4. Blennius semifasciatus.

Rüppell, N. W. Fische, p. 134.

D. 29. A. 20.

The anterior profile of the snout subvertical. Crest on the head none; a short fringed tentacle above the orbit, none at the nostril. The lower jaw with a strong curved tooth, another smaller one in the upper jaw. Dorsal fin not notched, and of equal height. Brown: back with seven dark cross-bars, each formed by two streaks; whitish lines diverge from the eye downwards; opercles and pectoral fins dotted with whitish; a blackish spot between the first and second dorsal spines.

Massuah (Red Sea).

5. Blennius cornifer.

Rüppell, Atlas Fische, p. 112, and *N. W. Fische,* p. 133.

D. 32. A. 25.

The anterior profile of the head subvertical; eyes rather large, with a long simple tentacle above; some very fine tentacles on each side of the nape; crest none; no curved tooth in the jaws. Dorsal fin scarcely notched. Light brown: head, body, and anal fin dotted with blue.

Djetta (Red Sea).

6. Blennius capito.

Cuv. & Val. xi. p. 260.

D. $\frac{12-13}{19-20}$. A. 22–23.

The height of the body is contained five times and a half in the total length, the length of the head four times and three-fourths. Snout obtuse, with the upper profile abruptly descending. Jaws without a curved tooth. Superciliary margin swollen, with a short fringed tentacle posteriorly; a transverse groove behind the tentacles. The arched portion of the lateral line formed by two series of pores. The dorsal and anal fins enveloped in thick skin; the dorsal begins above the middle of the operculum, is very slightly notched, and not continuous with the caudal. Brown, varied with lighter.

Cape Seas.

a. Adult. Cape of Good Hope.
b. Adult: stuffed. Cape of Good Hope. From Sir A. Smith's Collection.
c. Adult: stuffed.

7. Blennius erythrocephalus.

Blennius erythrocephalus, *Risso, Eur. Mérid.* iii. p. 236. fig. 42.
Blennius rubriceps, *Cuv. & Val.* xi. p. 248.

D. $\frac{12}{21}$. A. 22.

The first three rays of the dorsal fin are somewhat elevated and remote from the others; the soft portion continuous with the caudal. A longitudinal crest on the head (in males), and a very small tentacle above the orbit. The curved teeth in the jaws are well developed. Brownish: the top of the dorsal and the upper part of the head red.

Mediterranean.

8. Blennius tentacularis.

Blennius tentacularis, *Brünn. Pisc. Mass.* p. 26; *Bl. Schn.* p. 169; *Lacép.* ii. p. 474; *Cuv. & Val.* xi. p. 212. pl. 319; *Guichen. Explor. Algér. Poiss.* p. 69.
—— auritus, *Pall. Zoogr.* iii. p. 172; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 403. pl. 6. fig. 2.
—— minutus et ventrosus, *Rathke, Fauna der Krym*, pp. 330, 331.
—— cornutus, *Lacép.* ii. p. 473; *Risso, Ichthyol. Nice*, p. 128.
—— punctulatus, *Risso, Eur. Mérid.* iii. p. 231.
—— brea, *Risso, Ichthyol. Nice*, p. 129, and *Eur. Mérid.* iii. p. 233.

D. $\frac{12-13}{19-20}$. A. 22–24.

The height of the body is nearly equal to the length of the head, and five times and a half in the total. Snout obtuse, with the upper profile abruptly descending. A strong curved tooth in both the jaws. Orbital tentacle well developed; the interorbital space is scarcely concave, and its width is less than the vertical diameter of the eye; no transverse groove behind the tentacles. The dorsal fin commences in the vertical from the præopercular margin, and has flexible spines; no notch between the spinous and soft portions, the latter being slightly continuous with the caudal. A black spot between the first and third dorsal spines. Reddish-grey with brown spots, and generally with brown cross-bars on the back. Sometimes more uniform, and only the head and the anterior part of the body dotted with brown. Three angular brown bands on the throat, the angles pointing backwards.

Mediterranean.

a. Adult. Sicily. Presented by W. Swainson, Esq., as *Blennius cornutus*.
b–c. Adult. Dalmatia.
d, *e–f*. Adult.
g. Adult: skin. From the Collection of the Zoological Society.

9. **Blennius filicornis.**

Cuv. & Val. xi. p. 254; *Casteln. Anim. nouv. ou rares de l'Amér. Sud, Poiss.* p. 25.

D. $\frac{12}{21-22}$. A. 23.

The height of the body is contained five times and one-fifth in the total length, the length of the head four times and three-fourths. Snout obtuse, with the upper profile very oblique. A strong curved tooth in both jaws. Orbital tentacle of moderate length, filiform, with several smaller ones at its base. The interorbital space is flat, and its width is one-half of the vertical diameter of the orbit; no groove or crest on the neck. The dorsal fin commences in the vertical from the præopercular margin and has flexible spines; a slight notch between the spinous and soft portions, the latter not being continuous with the caudal. Brown; dorsal and caudal spotted with darker.

Coast of Brazil.

a. Adult. Bahia. Purchased of M. Parzudaki.

10. **Blennius smyrnensis.**

Pholis smyrnensis, *Cuv. & Val.* xi. p. 275. pl. 325.

D. 35. A. 26.

Tentacles neither above the orbit nor at the nostril. The length of the head equals its height, and is contained five times and one-third in the total. Dorsal fin not emarginate; the anal commences below the thirteenth dorsal ray. Reddish-grey. (*Val.*)

Coast of Smyrna

11. Blennius rouxi.

Cocco, Lett. Pesci Mess. in Giorn. Sc. Lett. &c. x. & xi. p. 11. tab. 9. fig. 1; *Bonap. Faun. Ital. Pesci*, cum fig.

D. 34. A. 26.

The height of the body equals the length of the head, and is contained five times and a half in the entire length. The anterior profile of the head is subvertical; orbital and nasal tentacles small; canine teeth in both jaws; dorsal fin not notched. A deep-black band along the side of the body; an oblong blackish spot between the three anterior spines.

Mediterranean.

One specimen in the Senckenberg Museum.

12. Blennius fucorum.

Cuv. & Val. xi. p. 263. pl. 324; *Dekay, New York Fauna, Fishes*, p. 149. pl. 22. fig. 66.

D. $\frac{11}{17}$. A. 18.

The length of the head is one-fifth of the total; its anterior profile is subvertical. Orbital tentacle nearly as long as the head, filiform, bifid superiorly, with some fringes at the base. A very strong curved tooth in both jaws. The dorsal is slightly emarginate, and not continuous with the caudal. Reddish-brown, dotted with black. (*Val.*)

Atlantic.

Is this the species described by Quoy and Gaimard (Voy. Freyc. Zool. p. 250) under the name of *Blennius punctatus*?

13. Blennius gentilis.

Girard, Proc. Acad. Nat. Sc. Philad. vii. 1854, p. 149, and *U. S. Pacif. R. R. Exped. Zool. Fishes*, p. 113 (pl. 25 *a*. fig. 4).

B. 5. D. $\frac{12}{17}$. A. 19.

The height of the body is nearly equal to the length of the head, and one-fifth of the total. A curved tooth in both jaws, that of the upper being the smaller. Orbital tentacles slender; occipital crest none; the dorsal commences almost at the occiput, and is very slightly notched. Yellowish-brown, marbled with purple. (*Gir.*)

Monterey (California).

14. Blennius vulgaris.

Blennius vulgaris, *Pollini, Viaggio al Lago di Garda, Verona*, 1816, viii. p. 20. fig. 1; *Martens in Wiegm. Arch.* xxiii. p. 172. tab. 9. fig. 3.
—— cagnota, *Cuv. & Val.* xi. p. 249.
—— anticolus, *Bonap. Faun. Ital. Pesci.*
—— vulgaris, var. anticolus, *Martens, l. c.* p. 174.

D. $\frac{12}{17-18}$. A. (18) 19–20. Vert. 35–36.

The height of the body is nearly equal to the length of the head, and one-fifth of the total. Snout somewhat prominent. A curved tooth in both jaws. Orbital tentacle very small; the interorbital space is rather flat, and its width is nearly equal to the vertical diameter of the orbit; a low fleshy crest on the head. The dorsal fin commences in the vertical from the origin of the lateral line, is scarcely notched, and not, or slightly, continuous with the caudal. Yellowish, spotted and dotted with black; two oblique dark stripes below the eye.

Lakes of Italy (Mediterranean).

a–b. Fine specimens. Dalmatia.
c. Adult. Lake Albano. Presented by Dr. E. v. Martens.
d. Half-grown. Lake Bracciana, near Rome. Presented by W. C. Trevelyan, Esq.
e. Many specimens. Lago di Nemi. Presented by Dr. E. v. Martens.
f–n. Adult and half-grown. Lago di Garda. Presented by Dr. A. Günther.
o. Many specimens. Lago di Garda. Presented by Dr. E. v. Martens.

The chief difference between the specimens from the fresh waters of Italy, and the *Bl. cagnota*, Valenc., from the coast of Toulon, appears to consist in the number of the mandibulary teeth. *Bl. vulgaris* has from fourteen to eighteen, *Bl. cagnota* from ten to twelve. I should think this character of some importance if it proved to be constant, because one of these fishes lives in fresh, the other in salt water. The dorsal fin is generally not continuous with the caudal, except in a slight degree in the specimens from Dalmatia. I do not know whether the latter were taken on the coast or in a freshwater lake.

15. **Blennius sanguinolentus.**

Pholis, *Rondel.* vi. c. 23. p. 206; *Gesner*, p. 714; *Aldrov.* p. 116; *Willughby*, pl. H. 6. fig. 4.
Blennius sanguinolentus, *Pall. Zoogr.* iii. p. 168; *Nordm. in Demid. Voy. Russ. Mérid. Poiss.* p. 402. pl. 6. fig. 1.
—— pholis, *Risso, Eur. Mérid.* iii. p. 232; *Guichen. Explor. Algér. Poiss.* p. 70.
—— palmicornis, *Cuv. & Val.* xi. p. 214. pl. 320; *Jenyns, Zool. Beagle, Fishes*, p. 83; *Lowe, Proc. Zool. Soc.* 1839, p. 83, & 1843, p. 86, and *Trans. Zool. Soc.* iii. p. 9.
—— parvicornis, *Cuv. & Val.* xi. p. 257.

B. 6. D. $\frac{12}{21}$. A. (2+) 21–22.

The height of the body is contained five times and a quarter in the total length, the length of the head five times to five times and three-quarters. Snout obtuse, with the upper profile very oblique. The curved tooth in the upper jaw small, that in the lower of moderate size. Orbital tentacle very small. The interorbital space is flat, and its width is less than the vertical diameter of the eye; no groove or crest or fleshy protuberance on the neck. The dorsal fin commences in the vertical from the præopercular margin, and has flexible spines; it is not, or slightly, notched, and continuous with the caudal. Brown; sometimes with several whitish spots on the side.

Mediterranean. Sea of Madeira. North-west coasts of Africa.

a, b. Adult. Niger Expedition. From Mr. Fraser's Collection.
c, d, e–f, g. Adult and half-grown. Madeira.
h, i–k. Adult. Mediterranean. From the Haslar Collection.
l. Seven inches and a half long. From the Collection of the Zoological Society.
m. Half-grown. From the Collection of the Zoological Society.

16. **Blennius sinensis.**

D. $\frac{12}{21}$. A. (2+) 22.

The height of the body equals the length of the head, and is contained five times and a half in the total. Snout obtuse, with the upper profile very oblique. A curved tooth of moderate size in each of the jaws, that of the upper being the smaller. Orbital tentacle small, formed by four short filaments. The interorbital space equals in width the diameter of the eye, and, like the crown of the head, is covered with a fleshy protuberance. The dorsal fin commences in the vertical from the præopercular margin, and has the upper profile nearly even; the spines are flexible, and the length of one of the longest is not quite two-thirds of that of the head; the soft portion is not, or very slightly, continuous with the caudal. The anal fin is rather more than half as high as the soft dorsal. The pectoral does not extend on to the vent. Uniform brown (in spirits): the vertical fins black; the tips of the anal rays bluish-white.

China Sea.

a. Adult. China Sea. Presented by Captain Sir E. Belcher, C.B.

This species is the Chinese representative of the Mediterranean *Blennius sanguinolentus*.

	inches.	lines.
Total length	6	1
Height of the body	1	1
Length of the head	1	1
——— of the first dorsal spine	0	8
——— of the pectoral	1	0
——— of the ventral	0	8

17. **Blennius pantherinus.**

Cuv. & Val. xi. p. 262.

D. $\frac{11}{21}$. A. $\frac{2}{21}$.

Orbital tentacles short and fringed; the interorbital space very concave; head without crest. The length of the head is about one-third of the total; a curved tooth in both the jaws. Brown, marbled with darker; throat with two blackish transverse bands. (*Val.*)

Coast of Brazil.

18. **Blennius sordidus.**

Benn. Zool. Journ. iv. p. 34; *Cuv. & Val.* xi. p. 256.

D. $\frac{12}{17}$. A. $\frac{2}{19}$.

Orbital tentacles fringed; no curved tooth in the jaws; the first dorsal ray rather more free than the others. Reddish-brown, with two or three dark blotches on the back; dorsal anteriorly with a deep-brown spot; caudal with three vertical series of brown dots.

Sandwich Islands.

a. Adult. Sandwich Islands. From Mr. Gerrard's Collection.—Type of the species.

19. **Blennius varus.**

Blennius sujefianus, *Risso, Ichth. Nice*, p. 131; (not *Lacép.*).
—— varus, *Risso, Eur. Mérid.* iii. p. 237; *Bonap. Faun. Ital. Pesci*, cum fig.; (not *Pall.*).

D. 30. A. 21.

The height of the body is nearly equal to the length of the head, and one-fifth of the total; neck with a compressed fleshy crest; orbital tentacle scarcely visible; a curved tooth on each side of the jaws. The dorsal begins in the vertical from the posterior extremity of the operculum, is slightly emarginate, and extends on to the caudal. Brownish-olive, with dark bands across the back.

Mediterranean.

a. Adult. Mediterranean. Presented by Dr. E. Rüppell.

20. **Blennius basiliscus.**

? *Forskal*, p. 22 & p. xiv.
Blennius basiliscus, *Cuv. & Val.* xi. p. 245.

B. 6. D. $\frac{12}{22-24}$. A. 27.

The height of the body is five times in the total length, the length of the head five times and a half. Snout obtuse, with the upper profile convex and abruptly descending. A very strong curved tooth in the lower jaw, a more feeble one in the upper. Crown elevated in a more or less prominent fleshy crest, beginning between the orbits; orbital tentacle scarcely visible. The dorsal fin commences above the gill-opening, is not notched, and very slightly continuous with the caudal. The length of the ventral is one-half of that of the head. Greenish-olive, with black vertical bands, each being white-edged and divided into two by another white vertical streak; head with a brownish-black, white-edged band through the eye; no black spot behind the eye; throat with three brown angular bands, the angles pointing backwards.

Mediterranean.

a. Adult. From the Haslar Collection.
b. Adult. Adriatic.
c. Adult: skin. Leghorn. From Mr. Yarrell's Collection.

21. Blennius graphicus.

Risso, Eur. Mérid. iii. p. 234. fig. 44.

D. 38. A. 26.

Orbital tentacle long, with two appendages at the base. Yellowish: head and body with small blue streaks. (*Risso.*)

Mediterranean.

22. Blennius sphinx.

Cuv. & Val. xi. p. 226. pl. 321; *Guichen. Explor. Algér. Poiss.* p. 70.

D. $\frac{12}{16}$. A. 20.

The height of the body equals the length of the head, and is five times and a half in the total. The snout is very obtuse, with the anterior profile subvertical. The anterior portion of the dorsal is elevated, and higher than the body; a very distinct notch between the soft and spinous dorsal. The lower jaw with two strong curved teeth on each side; the upper with only one, which is feeble. Orbital tentacles well developed, filiform. Yellowish-green, with six or seven brown, white-edged cross-bands; the upper portion of the spinous dorsal with five bluish longitudinal lines. A blue spot, edged with red, behind the eye; sides of the head with small white spots, edged with black. Throat with three oblique brown bands.

Mediterranean.

23. Blennius pavo.

Galerita s. Alauda cristata, *Rondel.* vi. cap. 21. p. 204; *Gesner*, p. 17; *Aldrov.* i. cap. 25. p. 114; *Willughby*, p. 134. tab. H. 6. fig. 7.

Alauda non cristata, *Rondel.* vi. cap. 22. p. 205.

Blennius pavo, *Risso, Ichth. Nice*, p. 133, and *Eur. Mérid.* iii. p. 235; *Cuv. & Val.* xi. p. 238. pl. 323; *Guichen. Explor. Algér. Poiss.* p. 73.

—— lepidus, *Pall. Zoogr. Ross.* p. 171; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 405. pl. 6. fig. 3.

D. $\frac{12}{21-22}$. A. 24–25. Vert. $\frac{11}{26-27}$.

The height of the body is nearly equal to the length of the head, and one-fifth of the total. Snout obtuse, with the upper profile convex and abruptly descending. A very strong curved tooth in the lower jaw, a more feeble one in the upper. Crown of the male specimens elevated in a more or less prominent fleshy crest, beginning between the orbits; orbital tentacle very small. The dorsal fin commences above the middle of the operculum, is not notched, and continuous with the caudal. Brownish-green, with broad dark cross-bars on the back; the anterior part of the body with light-bluish vertical stripes; a dark-blue band from the crest on the head through the eye to the throat, which is crossed by three angular brown bands; a black, white-edged spot behind the eye.

Mediterranean.

a, b. Fine specimens. Coast of Dalmatia.
c–d. Adult. Adriatic.
e–h. Young: skins. Livorno. From Mr. Yarrell's Collection.

24. Blennius ocellaris.

Scorpioides, *Rondel.* vi. cap. 20. p. 204 (bad); *Gesner*, p. 847; *Aldror.* p. 116.
Blennius (Mesoro), *Salv. Aq.* p. 217; *Bellon.* p. 221; *Gesner*, p. 130; *Aldror.* p. 203; *Jonston*, i. tit. 3. cap. 1. art. 15. tab. 19. fig. 5; *Willughby*, p. 131. tab. H. 3. fig. 2; *Ray*, p. 72.
Blennius, n. 1, *Artedi, Gen.* p. 26; *Klein, Pisc. Miss.* v. p. 31. n. 1.
Blennius ocellaris, *L. Syst.* i. p. 442; *Brünn. Pisc. Mass.* p. 25; *Bl.* taf. 167. fig. 1; *Bl. Schn.* p. 168; *Risso, Ichth. Nice*, p. 125, and *Eur. Mérid.* iii. p. 229; *Montag. Wern. Mem.* ii. p. 443. pl. 22. fig. 2; *Martens, Reise nach Venedig*, ii. p. 418; *Cuv. & Val.* xi. p. 220; *Yarrell, Brit. Fishes*, 2nd edit. i. p. 253; *Cuv. Règne Anim. Ill. Poiss.* pl. 77. fig. 1.
—— papilio, (*L. Gm.*) *Guichen. Explor. Algér. Poiss.* p. 70.
—— lepus, *Lacép.* ii. p. 461.
Adonis pavoninus, *Gronov. Syst. ed. Gray*, p. 93.

$$\text{D. } \frac{11\text{–}12}{15\text{–}16}. \quad \text{A. } 18. \quad \text{Vert. } \frac{11}{21\text{–}22}.$$

The height of the body is nearly equal to the length of the head, and four times and two-thirds in the total. Snout truncated, with the anterior profile vertical. A strong curved tooth in both jaws. Orbital tentacle well developed; the interorbital space is concave, and its width is much less than the vertical diameter of the eye. The spinous dorsal elevated, rather higher than the body; the soft not continuous with the caudal. A round black, white-edged spot on the sixth and seventh dorsal spines; body brownish, with darker cross-bars.

Mediterranean. Coasts of the Peninsula, France, and South England.

a. Adult: stuffed. Plymouth. Presented by Lieut. H. F. Spence, R.N.
b. Half-grown. Torcross (Devonshire). From the Leach Museum.
c. Half-grown. South Devonshire. From the Leach Museum.
d. Adult: skin. South Devonshire. From Mr. Yarrell's Collection.
e. Adult: skin. From Gronow's Collection.
f, *g–l*, *m–q*, *r*, *s*, *t*, *u*, *v*. Adult and half-grown.
w. Adult: skeleton.

Skeleton.—The general form and structure of the skull is the same as in *B. gattorugine*, the different ridges being somewhat more prominent: the interorbital space, which is flat in *B. gattorugine*, is concave; the posterior portion of the infraorbital ring is bent outwards; lower jaw longer than broad. There are eleven abdominal and twenty-one caudal vertebræ, the length of the former portion being to that of the caudal as 1 : 1·7.

25. Blennius galerita.

Blennius, n. 4, *Artedi, Genera*, p. 27 (not *Synon.*); *Klein, Pisc. Miss.* v. p. 32.
—— galerita, *L. Syst.* i. p. 441; *Bl. Schn.* p. 169; *Montagu, Wern. Mem.* i. p. 98. pl. 5. fig. 2.
—— montagui, *Flem. Brit. Anim.* p. 206; *Cuv. & Val.* xi. p. 234. pl. 322; *Yarr. Brit. Fishes*, 2nd edit. i. p. 249, 3rd edit. ii. p. 355; *Guichen. Explor. Algér. Poiss.* p. 72.

Blennius artedii, *Cuv. & Val.* xi. p. 231; *Guichen. Explor. Algér. Poiss.* p. 72; *Lowe in Trans. Zool. Soc.* iii. p. 9.
—— inæqualis, *Lowe in Trans. Zool. Soc.* ii. p. 185.

D. $\frac{12}{16-17}$. A. 17–18.

Snout short, with the anterior profile straight and very oblique. A strong curved tooth in the lower jaw, none in the upper. Only one tentacle between the eyes, above their posterior part; a series of very small tentacles behind. The dorsal commences in the vertical from the extremity of the operculum; the spinous and soft portions of the dorsal fin separated by a distinct notch; the latter not continuous with the caudal. Brownish-grey, spotted with darker; back sometimes with blackish cross-bars; a series of silvery spots along the lower part of the sides.

Mediterranean. Sea of Madeira. South coast of England.

a, b–d, e–l. Adult and half-grown. Falmouth.
m–p. Adult. South Devonshire. Museum Leach. Typical specimens of Montagu's description.
q–r. Adult. Madeira. Presented by the Rev. H. Methuen.
s. Adult: skin. From Mr. Yarrell's Collection.

There can be no doubt that this species is intended by Artedi's diagnosis, "*Blennius crista capitis transversa, cutacea.*" Linné, when he introduced his *Bl. galerita* into the system, not only quoted Artedi, but used his very words, confounding it, however, with a Blennioid fish described by Ström (*Blenniops ascanii*). Therefore the specific denomination of *galerita* is applied with much more right to the present species than to the fish described by Ström; and the meaning of the name itself denotes the peculiar crest of this Blennius far better than the orbital tentacles of the other.

26. Blennius cristatus.

Blennius, sp., *Gronov. Zoophyl.* n. 263. tab. 6. fig. 4; *Klein, Pisc. Miss.* v. p. 32. n. 3.
—— cristatus, *L. Syst.* i. p. 441.
—— nuchifilis, *Cuv. & Val.* xi. p. 253.
Adonis cristatus, *Gronov. Syst. ed. Gray,* p. 95.

D. $\frac{12}{15}$. A. 16.

The height of the body is nearly equal to the length of the head, and one-fifth of the total. Snout obtuse, with the anterior profile abruptly descending; small curved teeth in the jaws. A single short orbital tentacle; nape of the neck with a filamentous crest. The dorsal fin begins in the vertical from the upper end of the præoperculum, is very slightly notched, and not continuous with the caudal. Greyish or brownish, with darker bands across the back and irregular spots on the tail.

Island of Ascension.

a. Adult: skin. From Gronow's Collection.—Type of the species. The orbital tentacles, being dried, are imperceptible.

27. Blennius crinitus.

Cuv. & Val. xi. p. 237; *Guichen. Explor. Algér. Poiss.* p. 72.

D. $\frac{12}{14-15}$. A. $\frac{2}{16-18}$.

The height of the body is nearly equal to the length of the head, and one-fifth of the total. Snout obtuse, with the anterior profile abruptly descending. A rather small curved tooth in the lower jaw, none in the upper. Superciliary margin with three or four very fine and short filaments; nape of the neck with a filamentous crest. The dorsal fin begins in the vertical from the upper end of the præoperculum, is scarcely notched, and not continuous with the caudal; the pectoral does not extend to the anal fin. Greyish, spotted with brown; a black spot between the first and second dorsal spines.

Coast of Pernambuco.

a. Adult. Pernambuco. Presented by J. P. G. Smith, Esq.

The specimen upon which Valenciennes established this species was obtained at La Rochelle; others have been found on the coast of Algiers. The description given, however, agrees very well with the South American fish in the British Museum.

28. Blennius emarginatus.

D. $\frac{12}{14}$. A. (2+) 17.

The height of the body is nearly equal to the length of the head, and contained four times and two-thirds in the total. Snout obtuse, with the anterior profile very oblique. A small curved tooth in the lower jaw, none in the upper. The interorbital space is concave, and its width is less than the diameter of the eye. A fringed tentacle at the nostril; four or five short filaments above the posterior angle of the orbit; nape of the neck with a longitudinal series of filaments. The dorsal fin commences in the vertical from the præopercular margin, and is not continuous with the caudal; it is deeply notched between the spinous and soft portions, the former being much the lower. The pectoral is longer than the ventral, and extends on to the fifth anal ray. Colours?

Hab. ——?

a–e. Discoloured. Presented by J. B. Jukes, Esq.

	lines.
Total length	33
Height of the body	7

29. Blennius macropteryx.

Blennius macropteryx, *Rüpp. in Mus. Senck.*

D. $\frac{12}{17}$. A. 20.

The pectoral extends on to, or beyond, the middle of the anal fin. Dorsal fin notched, not reaching to the caudal. Colours?

Messina.

Three specimens, one inch long, and apparently immature, have been discovered by Dr. Rüppell at Messina and deposited in the Senckenberg Museum.

30. Blennius bifilum.

D. $\frac{11}{18}$. A. 22.

The height of the body is nearly equal to the length of the head, and contained five times and three-fourths in the total. Snout very obtuse, with the anterior profile abruptly descending. Jaws without a curved tooth. Orbital tentacle none; a pair of slender filaments between the occiput and the neck, one placed at the side of the other. The dorsal fin commences above the operculum, is slightly notched, and not continuous with the caudal. The pectoral is longer than the ventral, and extends on to the vent. Brownish-grey (in spirits), with eight darker cross-bands, the three anterior of which run round the belly and are edged with silvery; body with pearl-coloured dots; caudal fin with brown dots forming cross-streaks.

Hab. —— ?

a. Presented by Sir A. Smith.

	lines.
Total length	23
Height of the body	4

31. Blennius lupulus.

Bonap. Faun. Ital. Pesci, cum fig.

D. 29. A. 18.

The height of the body is nearly equal to the length of the head, and one-fifth of the total. The snout is slightly produced. A curved tooth on each side of the jaws. Orbital tentacle very small. The dorsal fin begins in the vertical from the extremity of the operculum, is very slightly notched, and not continuous with the caudal. Brownish-olive, spotted with blackish. (*Bonap.*)

Mediterranean.

32. Blennius fissicornis.

Cuv. & Val. xi. p. 257; *Quoy & Gaim. Voy. Uran. Zool.* p. 251.

D. $\frac{11-12}{14-15}$. A. 18.

A strong curved tooth in the jaws. A small tentacle at the nostril. Orbital tentacle of moderate length, filiform, with several smaller ones at the base. Dorsal fin deeply notched. Brownish. (*Val.*)

? Rio de Janeiro.

33. Blennius æquipinnis.

D. $\frac{12}{12}$. A. 16. V. 2.

The height of the body is nearly equal to the length of the head, and contained four times and a half in the total. Snout obtuse, with the anterior profile very oblique. A strong curved tooth in the lower jaw, none in the upper. The interorbital space is concave, and its width less than the diameter of the eye. A small tentacle at the nostril, and a bunch of short filaments above the posterior angle of the orbit; nape of the neck naked. The dorsal fin commences above the operculum, and is not continuous with the caudal; it is deeply notched, and the anterior portion is rather lower than the posterior. The pectoral reaches to the origin of the anal. Colour ?

West Africa.

a. Young. West Africa. From Mr. Rich's Collection.

	lines.
Total length	18
Height of the body	4
Length of the head	4

34. **Blennius brevipinnis.**

D. $\frac{11}{12}$. A. 15–16.

The height of the body is nearly equal to the length of the head, and contained four times and a half in the total. The snout is obtuse, with the upper profile very oblique. Jaws without a curved tooth. Orbital tentacle slender, fringed at the base. The dorsal fin commences in the vertical from the operculum, is deeply notched, and not continuous with the caudal. The pectoral is longer than the ventral, and extends on to the vent. Greyish-brown (in spirits), with a darker lateral band.

a. Sandwich Islands. From the Haslar Collection.
b. West coast of Central America. Collected by Captain Dow. Presented by Dr. P. L. Sclater, Secr. Zool. Soc.

	lines.
Total length	18 or 23
Height of the body	4 or 5

35. **Blennius pholis.**

? Φωλὶς, *Aristot.* ix. cap. 37.
Pholis, *Rondel.* vi. cap. 23. p. 206; *Aldrov.* i. cap. 25. p. 116; *Gesner*, p. 714; *Jonston*, i. tit. 2. cap. 2. art. 1. taf. 17. fig. 4; *Willughby*, p. 135. tab. H. 6. fig. 4; *Ray*, p. 74; *Artedi, Synon.* p. 116.
Blennius pholis, *L. Syst.* i. p. 443; *Bl. Fische Deutschl.* ii. p. 184. taf. 71. fig. 2; *Bl. Schn.* p. 170; *Lacép.* ii. p. 489; *Donov. Brit. Fishes*, iv. pl. 79; *Parn. Fishes Frith of Forth*, p. 73; *Yarrell, Brit. Fishes*, 1st edit. i. p. 230, 2nd edit. i. p. 260, 3rd edit. ii. p. 366; *Couch, Trans. Linn. Soc.* xiv. pp. 74, 75; *Martens, Reise nach Venedig*, ii. p. 419.
Blennius, sp., *Gronov. Zoophyl.* no. 259, and *Mus. Ichth.* ii. p. 22. no. 175.
Smooth Blenny, *Penn. Brit. Zool.* iii. p. 182. pl. 36.
Pholis lævis, *Fleming, Brit. Anim.* p. 207; *Cuv. & Val.* xi. p. 269; *Cuv. Règne Anim. Ill. Poiss.* pl. 77. fig. 2; *Nilss. Skand. Faun. Fisk.* p. 182.
Adonis pholis, *Gronov. Syst. ed. Gray*, p. 96.

D. $\frac{12}{18\text{–}19}$. A. 18–19 (20). Vert. 12/26–13/25.

The height of the body is five times in the total length, the length of the head four times and two-thirds. The snout is slightly produced, once and a half the length of the diameter of the eye. A curved tooth of moderate size in both jaws. Orbital tentacle none; the interorbital space appears quite flat, if covered with the skin; nape of the neck with a fleshy protuberance. The dorsal fin begins in the vertical from the extremity of the operculum, is very distinctly notched, and not continuous with the caudal; the spines are flexible. Greenish-olive, with irregular blackish spots; a metallic spot on the temple (during life).

Mediterranean. Atlantic coasts of Europe. Shores of the German Ocean.

a. Adult: skin. Frith of Forth.
b. Young. Scotland.
c–g. Adult and half-grown. Wales. Presented by Mrs. Gray.
h–i, *k–l*. Adult and young. South Wales. Presented by J. Stokes, Esq.
m. Half-grown. Polperro. Presented by J. Couch, Esq.
n. Large specimen. Falmouth. Purchased.
o, *p*, *q*, *r–s*. Many specimens. Falmouth. Purchased.
t–v. Adult and half-grown: stuffed and skins. Plymouth.
w, *x*. Adult. South Devonshire. Museum Leach.
y, *z*. Adult and young. English coast.
α. Adult. Isle of Bourbon (?). Purchased of M. Parzudaki.
β–γ, δ–ε, ζ–η, θ, ι, κ. Adult and half-grown.
λ–μ. Adult: skins.
ν. Adult: female skeleton. Wales. Presented by Mrs. Gray.
ο. Adult: skeleton. Purchased.

Skeleton.—This species differs somewhat from *B. gattorugine* and *B. ocellaris* in the form of its cranium, which is more elongate and less compressed. The longitudinal portion of the crest extends nearly the whole length of the crown of the head, the lateral portions being short and nearly rectangular to the former. The interorbital space is slightly concave, and half as wide as the orbit. Lower jaw longer than broad. In the other points, the skeleton does not differ essentially from that of *B. gattorugine*. There are thirteen abdominal and twenty-five caudal vertebræ, the length of the former portion being to that of the caudal as 1 : 1·65.

36. **Blennius trigloides.**

Blennius trigloides, *Cuv. & Val.* xi. p. 228; *Guichen. Explor. Algér. Poiss.* p. 71; *Bonap. Faun. Ital. Pesci*, cum fig.
Pholis lævis, *Lowe in Trans. Zool. Soc.* ii. p. 185, iii. p. 9, and *Proc. Zool. Soc.* 1839, p. 83.
—— trigloides, *Lowe in Proc. Zool. Soc.* 1843, p. 87.

$$\text{D. } 11 \left| \tfrac{1}{16}. \right. \quad \text{A. } 18.$$

The height of the body is five times and a half in the total length, the length of the head four times and a half. Snout with the anterior profile very oblique, once and a half the diameter of the eye. A curved tooth in both jaws. Orbital tentacle none; a short fringed tentacle at the anterior nostril; the interorbital space concave; neck swollen (in adult specimens). The dorsal fin begins above the middle of the operculum, is deeply notched, and not continuous with the caudal; the spines are flexible. Blackish-brown, with dark bands across the back.

Mediterranean. Sea of Madeira.

a. Fine specimen. Madeira. Purchased of Mr. Stevens.
b. Half-grown. Madeira. Purchased of Mr. Stevens.

37. Blennius geminatus.

Wood, Journ. Acad. Nat. Sc. Philad. iv. p. 278; *Cuv. & Val.* xi. p. 265.

D. $\frac{12}{15}$. A. 16.

The height of the body is four times in the total length, the length of the head four times and a half. Snout obtuse, with the upper profile straight and very oblique. A curved tooth in the lower jaw, that of the upper very small. Orbital tentacles long, each divided into three from the base; the interorbital space is very concave, and its width is one-half the vertical diameter of the eye; a transverse groove behind the tentacles. The dorsal fin begins immediately behind the vertical from the præopercular margin, is slightly emarginate, and not continuous with the caudal; its spines are stiff, not flexible at the top. The lateral line descends abruptly behind the pectoral. Brown, marbled with darker; a round black spot between the first and second dorsal spines.

Coast of South Carolina.

a. Adult.

38. Blennius punctatus.

Wood, l. c. p. 279; *Cuv. & Val.* xi. p. 267.

D. 27. A. 18.

The height of the body is one-fourth of the total. The profile between the extremity of the snout and the origin of the dorsal forms a quarter of a circle. Orbital tentacle long, bifid superiorly; neck with two small rough prominences. Head and body spotted with black; a blackish spot between the first and third dorsal spines; caudal with five brown bands.

Coast of South Carolina.

4. CHASMODES.

Chasmodes, *Cuv. & Val.* xi. p. 295.

Body oblong, naked; cleft of the mouth rather wide. A single dorsal fin; ventrals jugular, composed of two or three rays. A single series of immoveable teeth in the jaws (sometimes a small canine tooth in the upper jaw, behind the series). Head sometimes with tentacles. Gill-opening closed beneath, and reduced to a small fissure above the root of the pectoral. Branchiostegals six.

Atlantic coasts of temperate North America.

1. Chasmodes boscianus.

Blennius bosquianus, *Lacép.* ii. pl. 13. fig. 1.
—— pholis, *Mitch. Phil. & Lit. Trans. New York,* i. p. 374.
Chasmodes boscianus, *Cuv. & Val.* xi. p. 295. pl. 327; *Dekay, New York Fauna, Fishes,* p. 151. pl. 24. fig. 73.

B. 6. D. 29. A. 19. V. 2.

The mouth is cleft to below the posterior margin of the eye; snout slightly produced, with the upper profile oblique; canine teeth none. The dorsal is not emarginate, and continuous with the caudal. A very small tentacle above the orbit. Greyish, marbled with brown.

Atlantic coasts of North America.

2. Chasmodes quadrifasciatus.

Pholis quadrifasciatus, *Wood, Journ. Acad. Nat. Sc. Philad.* iv. p. 282. pl. 17. fig. 1.
Chasmodes quadrifasciatus, *Cuv. & Val.* xi. p. 298.

D. 27. A. 15.

The mouth is cleft to below the posterior margin of the orbit; snout slightly produced, with the upper profile oblique. A small canine tooth in the upper jaw. Body with four or five brown cross-bands; a series of yellowish spots along the base of the anal fin. (*Wood.*)

3. Chasmodes novem-lineatus.

Pholis novem-lineatus, *Wood, Journ. Acad. Nat. Sc. Philad.* iv. p. 280.
Chasmodes novem-lineatus, *Cuv. & Val.* xi. p. 299.

D. 30. A. 20.

Snout obtuse, with the anterior profile subvertical. The dorsal fin commences on the neck and extends on to the caudal. Brown: sides of the head dotted with dark blue; a blackish spot between the first and second dorsal rays. (*Wood.*)

Port of Charleston.

5. PETROSCIRTES*.

Petroscirtes, *Rüpp. Atl. Fische,* p. 110, and *N. W. Fische,* p. 134.
Blennechis, *Cuv. & Val.* xi. p. 279.
Aspidontus, (*G. Cuv.*) *Quoy & Gaim. Voy. Astrol. Zool.* iii. p. 719.

Body moderately elongate, naked. Snout generally short or of moderate extent. A single dorsal fin (in one species with a semi-detached portion); ventrals jugular, composed of two or three rays. Cleft of the mouth narrow; a single series of immoveable teeth in the jaws; a strong curved canine tooth behind this series; that of the lower jaw much stronger than that of the upper (in two species no canine tooth). Head sometimes with tentacles. Gill-opening closed beneath, and reduced to a small fissure above the root of the pectoral. Branchiostegals six (seven); air-bladder and pseudobranchiæ present; pyloric appendages none.

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* 1. Blennechis dussumieri, *Cuv. & Val.* xi. p. 282.—Ile de Bourbon.
2. Omobranchus fasciolatus, (*Ehrenb.*).—Blennechis fasciolatus, *Cuv. & Val.* xi. p. 287.—Red Sea.
3. Petroscirtes bankieri, *Richards. Voy. Sulph. Fishes,* p. 136. pl. 44. figs. 8, 9.—Hongkong.

Tropical parts of the Indian Ocean and Archipelago and of the Pacific. (Two anomalous species from Chile.)

1. Petroscirtes tapeinosoma.

Bleeker, Act. Soc. Sc. Indo-Nederl. ii., *Amboina,* p. 64.

D. 45. A. 30.

The height of the body is contained ten times and a half in the total length, the length of the head nearly six times. Snout convex, projecting far beyond the cleft of the mouth; tentacles none. The width of the interorbital space nearly equals the diameter of the eye. Upper jaw without canines. The dorsal fin is not elevated, and commences on the occiput. The upper half of the body violet, the lower white; the margin of the upper colour forms a band, including the superior part of the eye, and passing into a narrower stripe edged with white on the caudal fin; the middle of the sides is spotted with black; two bluish longitudinal streaks on the back; fins yellow, the dorsal and anal with a broad brown margin. (*Bl.*)

Seas of Amboyna and Celebes.

2. Petroscirtes rhinorhynchus.

Bleeker, Amboina & Ceram, p. 273.

D. 44. A. 32.

The height of the body is contained seven times in the total length, the length of the head five times and a half to five times and two-thirds. Snout conical, projecting beyond the cleft of the mouth; tentacles none. The width of the interorbital space equals the diameter of the eye. No canines in the upper jaw. The dorsal fin is not elevated, beginning on the occiput and terminating at the root of the caudal. Brownish, with two bluish longitudinal bands; fins yellow, the dorsal and anal edged with brown. (*Bl.*)

Coasts of Celebes, Amboyna, Ceram, and Goram.

3. Petroscirtes amblyrhynchus.

Bleeker, Act. Soc. Sc. Indo-Nederl. ii., *Amboina,* p. 64.

D. 43. A. 31.

The height of the body is one-eighth of the total length, the length of the head one-fifth. Snout obtuse, rounded, scarcely projecting beyond the cleft of the mouth; tentacles none. The width of the interorbital space equals the diameter of the eye. A small straight canine tooth in the upper jaw. The dorsal fin is not elevated, and commences on the occiput. Violet, with two bluish longitudinal bands on each side; fins yellow, the dorsal with seven, the anal with five brownish blotches; caudal with a large blackish spot at the base. (*Bl.*)

Sea of Amboyna.

4. **Petroscirtes tæniatus.**

Aspidontus tæniatus, *Quoy & Gaim. Voy. Astrol. Poiss.* p. 719. pl. 19. fig. 4.

Petroscirtes paradiseus, *Bleeker, Amboina,* v. p. 495.

B. 6. D. 39. A. 26.

The height of the body is one-sixth of the total length, the length of the head one-fifth. Snout produced; tentacle none; the width of the interorbital space is more than the diameter of the eye. The dorsal fin is not elevated, beginning before the gill-opening and terminating at the root of the caudal. A black longitudinal band from the snout through the eye to the caudal, becoming broader posteriorly, and occupying the middle of the caudal fin.

Coasts of Amboyna, Goram, New Guinea, and Guam.

5. **Petroscirtes filamentosus.**

Blennechis filamentosus, *Cuv. & Val.* xi. p. 280. pl. 326.

Petroskirtes rostratus, (*Solander*) *Bleek. Act. Soc. Sc. Indo-Nederl.* ii., *Amboina,* p. 62.

D. 36–37. A. 26–28. V. 3.

The height of the body is one-seventh of the total length, the length of the head one-fourth. The snout is somewhat elongate, longer than the eye, and has the upper profile nearly horizontal. The anterior rays of the dorsal fin are elongate and filamentous; the dorsal does not extend on to the caudal. A blackish longitudinal band from the snout through the eye along the side of the body; vertical fins blackish, the caudal with the upper and lower margins, the anal with the lower one whitish.

Coasts of New Guinea and Amboyna.

6. **Petroscirtes punctatus.**

Blennechis punctatus, *Cuv. & Val.* xi. p. 286.

D. $\frac{12}{22}$. A. 23.

The height of the body is contained six times in the total length, the length of the head five times and a half. Snout short; the upper canine tooth one-half the size of the lower. The dorsal fin extends on to the root of the caudal. Greyish, with three longitudinal series of small blackish spots, the upper along the base of the dorsal, the lower along the middle of the body. (During life white, with the spots of a green colour.) (*Val.*)

Bombay. Coast of Australia.

? *a*. From the Haslar Collection.
b, *c*. Half-grown. Australia. Purchased of Mr. Stevens.

7. Petroscirtes dispar.

A collection of fishes made by Mr. Swinhoe in the Chinese island of Amoy, and procured for the British Museum, contains, besides other interesting species, two specimens of a *Petroscirtes*, one of which is nearly twice the size of the other. Although the smaller one is a little more compressed and elevated, and *furnished with an occipital crest* (the only instance known, at present, in this genus), I consider both as belonging to the same species; they have the same coloration, and nearly the same form and number of the fin-rays. The examination of the sexual organs was not accompanied by a decisive result: a single elongate empty sac, which I took for the ovarium, was found in the larger specimen, whilst I could not detect any sexual organs whatever in the smaller one. Thus it is merely from analogy with *Salarias* that I describe them as sexual forms of one and the same species.

Description of the larger (female) specimen:—

D. 35. A. 25. V. 2.

The height of the body is contained six times and a fourth in the total length, the length of the head seven times. Snout short, somewhat longer than the diameter of the eye, truncated anteriorly. The canine teeth of the lower jaw are very large, three times the size of those of the upper. No tentacle or crest; interorbital space very narrow. The dorsal fin commences above the root of the pectoral, and the membrane by which the last ray is fixed to the back of the tail extends on to the root of the caudal: the first twelve rays are about half the height of the body, and not separated by a notch from the following rays; but the thirteenth ray is conspicuously longer than the twelfth, and the middle of the fin is rather higher than the body underneath. Caudal rounded. The anal fin is nearly equal in height to the anterior portion of the dorsal. The inner ventral ray is the longest, rather more than two-thirds the length of the head. Brownish-grey (in spirits): base of the dorsal and caudal fins yellow; the outer half of the dorsal and caudal and the entire anal grey. Cheek with an indistinct ovate brownish spot.

	lines.
Total length	50
Height of the body	8
Length of the head	7
——— of the ventral fin	4

The smaller (male?) specimen differs from the other in the following points:—

The height of the body is contained five times and a half in the total length, the length of the head six times. Snout very short, equal in length to the diameter of the eye. A high crescent-shaped crest occupies the head from between the orbits to the origin of the dorsal. The dorsal fin commences above the gill-opening, and gradually increases in height from its origin to the fifth ray before the last; the height of the twelve anterior spines is rather more than one-half the depth of the body. The ventral fin is nearly equal in length to the head. The spinous portion of the dorsal fin with two brown longitudinal lines, the soft with many oblique ones, ascending backwards. Cheek with a very distinct ovate spot, extending on the nape of the neck; an indistinct dark vertical band through the eye, and another before the gill-opening.

	lines.
Total length	33
Height of the body	6
Length of the head	5½
——— of the ventral fin	5

a, *b*. Amoy (China).

8. **Petroscirtes kallosoma.**

Bleeker, Biliton, iv. p. 227.

D. 32. A. 23.

The height of the body is contained eight times in the total length (without caudal filaments), the length of the head six times and a half. Snout obtuse, convex; tentacles none; the width of the interorbital space is less than the diameter of the eye; the canine tooth of the lower jaw is much longer than that of the upper. The dorsal fin is not elevated, and begins somewhat before the vertical from the gill-opening; the outer rays of the caudal produced into filaments. Body with alternate curved violet and white cross-streaks, the convexity pointing forwards; the posterior portion of the dorsal with brown longitudinal stripes and an oblong blackish-brown spot; anal brownish, edged with yellow, and with seven or eight oblique blue stripes; caudal rose-coloured. (*Bl.*)

Sea of Biliton.

9. **Petroscirtes elongatus.**

Peters in Wiegm. Arch. 1855, p. 249.

D. 32. A. 24. V. 2.

The height of the body is contained six times and a half in the total length (without caudal), the length of the head five times and one-third. Snout with a very convex profile, scarcely as long as the diameter of the eye. The width of the interorbital space is one-third the diameter of the eye. The canine teeth of the lower jaw twice the size of those of the upper. The dorsal fin is not elevated, emarginate, and begins somewhat before the vertical from the root of the pectoral. Caudal emarginate. Greenish: a white-edged ocellated spot on the operculum; dorsal and anal fins brown, with white stripes, longitudinal on the former and oblique on the latter. Male with an ocellated spot between the twenty-third and twenty-fifth dorsal rays.

Mozambique.

a. Adult.
b. Adult. Presented by J. B. Jukes, Esq.

10. **Petroscirtes variabilis.**

Petroscirtes variabilis, *Cantor, Catal. Malay. Fishes*, p. 200.
—— cynodon, *Peters in Wiegm. Arch.* 1855, p. 246.

B. 6. D. 28–31. A. 17–21. Vert. 12/23.

The height of the body is one-sixth of the total length, the length of the head one-fifth. The snout is somewhat produced, truncated in front. The canine teeth of the lower jaw very large, those of the upper small. Orbital tentacle none. The width of the interorbital space is more than the diameter of the eye, which is contained four times in the length of the head. The dorsal fin is not elevated, commences on a line with the posterior margin of the præoperculum, and terminates at a short distance from the root of the caudal. The two inner rays of the ventral fin equal in length. Caudal fin sometimes with some of the upper and lower rays prolonged. From the orbit to the caudal a longitudinal blackish band; dorsal and anal spotted and dotted with black; caudal fin sometimes with a black central spot; dorsal fin dark along the base.

Coast of Mozambique. Sea of Pinang. Port Jackson.

a, b. Adult: skins. Pinang. From Dr. Cantor's Collection.—Types of the species.
c–d. Adult males. Mozambique. From Prof. Peters's Collection, as *P. cynodon*.
e. Half-grown. Port Jackson. Purchased of Mr. Cuming.—This specimen differs from the others in not having the base of the dorsal fin dark-coloured, whilst the upper portion is blackish, dotted with white.

Air-bladder present.

11. **Petroscirtes breviceps.**

Blennechis breviceps, *Cuv. & Val.* xi. p. 283.

D. 30. A. 19.

The height of the body is contained four times and two-thirds in the total length, the length of the head four times and a quarter. Head broad, with the snout longer than the diameter of the eye. The dorsal fin is not elevated, begins above the gill-opening, and extends on to the caudal. A blackish band along the head and body; dorsal dotted with black; caudal yellowish.

Bay of Bengal.

12. Petroscirtes ancylodon.

Rüppell, N. W. Fische, p. 1. taf. 1. fig. 1.

D. 29. A. 19.

The height of the body is contained four times and a half in the total length. Snout of moderate extent; a small tentacle above the orbit. The dorsal fin is not elevated, commences before the gill-opening, and does not extend on to the caudal. A very large canine tooth in the lower jaw, a pair of small ones on each side of the upper. Back with six irregular brown cross-bars; the lower part of the sides with several series of whitish spots; the margin of the dorsal with two longitudinal series of white dots; caudal whitish, pectorals yellow.

Massaua (Red Sea).

13. Petroscirtes polyodon.

Blennechis polyodon, *Bleek. Blenn. en Gob.* p. 254.

B. 6. D. 30. A. 20. V. 3.

The height of the body is contained five times and three-quarters to six times in the total length, the length of the head four times and a half. Snout obtuse; a small tentacle above the orbit; the width of the interorbital space equals the diameter of the eye. The dorsal fin is not elevated, begins before the gill-opening, and extends on to the base of the caudal. A white band from the snout below the eye to the caudal fin; sides of the head punctulated with black; the vertical fins brownish, dotted with rose-coloured and brown. (*Bl.*)

Seas of Java, Celebes, and Amboyna.

14. Petroscirtes cyprinoides.

Blennechis cyprinoides, *Cuv. & Val.* xi. p. 286.

D. 30. A. 19–20.

The height of the body is contained five times and a half in the total length, the length of the head four times and a quarter. Head broad, with the snout obtuse. The dorsal fin is not elevated, commences on a line with the posterior margin of the præoperculum, and terminates somewhat before the caudal. A white band along the middle of the side, above which are seven cross-bars, extending on to the dorsal fin. Caudal yellowish.

East Indies.

a. Between Bombay and Singapore.
b, c. From the Haslar Collection.

15. Petroscirtes solorensis.

Bleeker, Solor, p. 81.

B. 6. D. 30. A. 20.

The height of the body is contained five times and a half to six

times in the total length, the length of the head five times. Orbital tentacle none; the width of the interorbital space is less than the diameter of the eye. The canine teeth of the upper jaw are much smaller than those of the lower. The dorsal fin is not elevated, begins somewhat before the vertical from the gill-opening, and terminates at the root of the caudal. Body brownish-violet, belly yellow; two bluish longitudinal bands, the upper of which is interrupted; fins yellow, the vertical ones spotted with brown. (*Bl.*)
Sea of Lawajong (Solor).

Bleeker supposes that this species is allied to *Blennechis grammistes*, Cuv. & Val.; but it appears to me to be nearer to *P. breviceps* and *P. cyprinoides*, whilst *P. anema*, Bleek., exhibits a remarkable similarity to *P. grammistes*, a species established from a dried specimen.

16. Petroscirtes anema.

Bleek. Amboina & Ceram, p. 273.

D. 30. A. 16–18.

The height of the body is contained seven times in the total length, the length of the head five times and a half. Snout obtuse; no tentacle above the orbit; the width of the interorbital space is less than the diameter of the eye. The upper canine teeth are much smaller than the lower. On each side three black longitudinal bands, the middle of which passes through the eye; head punctulated with blue; fins yellow: the dorsal with a black band along the base, and with a blackish spot between the third and tenth rays; superiorly with oblique blue stripes; anal with a black band near the margin.
Seas of Amboyna, Banda, Batjan, and Booroo. China.

a. Fine specimen. Amboyna.—Anal with sixteen rays.
b. Half-grown. China. Presented by Captain Sir E. Belcher, C.B. —Anal with eighteen rays.

17. Petroscirtes grammistes.

Blennechis grammistes, *Cuv. & Val.* xi. p. 285.

D. 30.

Snout short, with the lower jaw longest; eye large. The length of the head is about one-fourth of the total. On each side three black longitudinal bands, the middle of which passes through the eye; dorsal fin with a black band between a pair of white ones; caudal and anal fins white, the former dotted with black. (*Val.*)
Sea of Java.

18. Petroscirtes temminckii.

Bleek. Banda, i. p. 243.

D. 31. A. 15.

The height of the body is contained five or six times in the total length, the length of the head five times and a half. Snout obtuse, not truncated. The lower canines much longer than the upper. The dorsal fin is not elevated, begins before the vertical from the gill-opening, and terminates at the root of the caudal. Above black, beneath white; two yellow bands from the head to the caudal; the posterior part of the belly and of the tail dotted with black; anal whitish, with black dots between the rays; caudal yellowish, with black dots on the rays. (*Bl.*)

Seas of Banda, Goram, Celebes, Ternate, and Amboyna.

19. **Petroscirtes bankanensis.**

Petroscirtes bankanensis, *Bleek. Banka*, ii. p. 727.
—— amboinenis, *Bleek. Amboina*, iii. p. 114.

D. 28. A. 19.

The height of the body is contained six times and a half in the total length, the length of the head five times and a third. The upper profile of the snout convex; a single small tentacle behind the orbit on the temple; the width of the interorbital space is more than the diameter of the eye. The canine teeth of the upper jaw are much smaller than those of the lower. The dorsal fin is not elevated, begins somewhat before the vertical from the gill-opening, and terminates at the root of the caudal. Body spotted with brown and dotted with blue; caudal yellow. (*Bl.*)

Coasts of Banka, Amboyna, and Nias.

20. **Petroscirtes heyligeri.**

Bleeker, Natuurk. Tydschr. Nederl. Ind. 1858, xvi. p. 340.

D. 27. A. 18. V. 3.

The height of the body is contained six times in the total length, the length of the head four times and one-third to four times and three-quarters. The snout is obtuse; the width of the interorbital space is one-half the diameter of the eye. Tentacles none. The upper jaw with a small canine tooth, the lower with one of moderate size. The dorsal fin is not elevated, commences above the gill-opening, and terminates at the base of the caudal. Yellowish, with about fourteen black vertical bands, extending on the dorsal and anal fins. (*Bl.*)

River Mussi (Palembang).

21. **Petroscirtes mitratus.**

Petroscirtes mitratus, *Rüpp. Atl. Fische*, p. 111. taf. 28. fig. 1; ?*Bleeker, Banda*, i. p. 244.
Blennechis mitratus, *Cuv. & Val.* xi. p. 293.
? Petroscirtes hypselopterus, *Bleek. Amboina*, vi. p. 423.

D. 25–26. A. 16–17.

The height of the body is contained five times and a half in the total length, the length of the head five times. The length of the snout and the width of the interorbital space equal the diameter of the eye (in a specimen not full-grown). The anterior part of the dorsal fin elevated; caudal emarginate. A fringed tentacle above the orbit; small skinny flaps on the side of the head. Yellowish, marbled with brown; sometimes two or three ocellated spots with yellow centre along the back.

Red Sea. [Seas of Banda Neira and Amboyna.]

a. Red Sea.

22. **Petroscirtes barbatus.**

Peters in Wiegm. Archiv, 1855, p. 248.

B. 6. D. 26. A. 18.

The height of the body equals the length of the head, and is contained three times and two-thirds in the length of the body (without caudal). The length of the snout equals the diameter of the eye, and is twice the width of the interorbital space. A branched tentacle above the orbit, and a pair of simple ones at the chin. The anterior portion of the dorsal elevated; caudal pointed. Greenish, with ferruginous spots; the vertical fins banded and spotted with brown. (*Pet.*)

Mozambique.

The "Blennechis à dorsale élevée" of Liénard (Dixième Rapport de la Société Hist. Nat. Maur. p. 35) belongs either to this or to the preceding species.

23. **Petroscirtes thepassii.**

Bleek. Ternate, p. 136.

B. 7. D. 28 $\left(\frac{3}{25}\right)$. A. 17.

The height of the body is contained eight times in the total length, the length of the head four times and a half. Snout rather acute; a small tentacle above the orbit. The three anterior dorsal rays are separated from the others by a notch. Body and vertical fins marbled with brownish. (*Bl.*)

Sea of Ternate.

The "Blennechis marbré" (Liénard, Dix. Rapp. Soc. Hist. Nat. Maur. p. 36) shows the same peculiarity in the structure of the dorsal fin, has the same number of rays, and appears to be closely allied to the above species.

24. **Petroscirtes anolis.**

Blennechis anolius, *Cuv. & Val.* xi. p. 288.

D. 29. A. 22.

Head elevated into a high crest; snout somewhat elongate. Five or six of the middle dorsal rays very elongate, filiform. Greenish, with darker vertical lines; head with some silvery streaks; cheek and base of the pectoral with a black spot; fins yellowish; dorsal blackish anteriorly, with numerous fine oblique brown stripes. (*Val.*)

Port Jackson.

25. Petroscirtes biocellatus.

Blennechis biocellatus, *Cuv. & Val.* xi. p. 289; *Gay, Hist. Chile, Zool.* ii. p. 263. lam. 6. fig. 3.

D. $\frac{11}{14}$. A. 19.

Body elevated anteriorly, its height before the dorsal being one-fifth of the total length, and behind it one-thirteenth. Snout with the anterior profile subvertical. *Canine teeth none.* The interorbital space is slightly grooved, and its width one-third of the diameter of the eye. A small forked tentacle above the orbit. The dorsal fin is not elevated, scarcely notched, begins on the occiput, and does not extend on to the caudal. Lateral line rudimentary. During life yellowish, marbled with black; a black, yellow-edged spot below the last rays of the dorsal, a similar but smaller one on the first three rays; throat with three brown bands. (*Val.*)

Coast of Chile.

26. Petroscirtes fasciatus.

Blennechis fasciatus, *Jenyns, Zool. Beagle, Fishes,* p. 84. pl. 17. fig. 1; *Gay, Hist. Chile, Zool.* ii. p. 265.

D. 13 | 16–18. A. 20–21. V. 2.

The height of the body is one-fifth of the total length, the length of the head one-fourth. Snout with the anterior profile subvertical. *Canine teeth none.* The interorbital space is very slightly concave, and its width one-half the diameter of the eye. Above each eye is a short, slightly palmated filament, not exceeding in length the diameter of the eye. The dorsal fin is not elevated, distinctly notched, commences at the nape and extends nearly to the caudal, with which, however, it is not connected. Yellowish, clouded with fuscous: three spots darker than the rest, arranged longitudinally beneath the posterior half of the dorsal, and having a subocellated appearance; the last the largest, and also the most distinct of the three. From the median line there are eight or nine descending fasciæ, alternating with the same number of oblong lanceolate spots. A large black spot on the first three rays of the dorsal fin, which is dotted with brown. Throat with three angulated transverse dark fasciæ.

Concepcion (Chile).

Blennechis ornatus, Jenyns, *l. c.* p. 85. pl. 17. fig. 2, cop. by Gay, *l. c.* p. 266, from Coquimbo (Chile), is probably identical with this species.

6. SALARIAS*.

Salarias, *Cuv. Règne Anim.*; *Cuv. & Val.* xi. p. 301.

Body moderately elongate, naked; snout short, with the cleft of the mouth transverse; a series of numerous small teeth in the jaws, implanted in the gum and moveable; generally a curved canine tooth on each side of the lower jaw, behind the series of small teeth. Palate smooth (in *S. vomerinus* teeth on the vomer). Dorsal fin continuous, sometimes divided into two portions by a more or less deep notch, without a detached anterior part; ventrals jugular, formed by a small hidden spine and two or three (four) rays. Tentacle above the orbit more or less developed. Gill-opening wide; pseudobranchiæ; branchiostegals six. Air-bladder and pyloric appendages absent.

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* 1. Salarias vermiculatoides, *Bleek. Act. Soc. Sc. Indo-Nederl.* iii., *Sumatra,* p. 40.—Sumatra and Java.
2. —— raaltenii, *Bleek. Blenn. en Gob.* p. 257. fig. 16.—Java.
3. —— kuhlii, *Bleek. Blenn. en Gob.* p. 258. fig. 17.—Java. 4.

Tropical seas of both hemispheres, extending northwards to Madeira, southwards to Tasmania and Chile.

I arrange the numerous species of this genus in two groups—the one having the dorsal fin without, the other with a distinct notch, by which the fin is divided into two more or less equal portions; and each of these groups may be subdivided into species having a crest on the head, and into others in which it is absent. We must bear in mind, however, that the crest has been proved, in several species, to be a peculiarity of the male sex; and therefore it may be presumed that, perhaps, several of the species referred, at present, to those without a crest may prove to be known from female specimens only, and to belong in reality to the crested ones.

Synopsis of the Species.

I. Species with the dorsal fin not notched.

a. With a crest on the head, p. 241.

1. S. flavo-umbrinus.
2. S. oryx.
3. S. sexfilum.
4. S. tridactylus (tetradactylus).

b. Without a crest on the head, p. 242.

5. S. atlanticus.
6. S. nitidus.
7. S. amboinensis.
8. S. rivulatus.
9. S. fasciatus.
10. S. fuscus.
11. S. nigro-vittatus.
12. S. cyclops.
13. S. ceramensis.
14. S. frenatus.
15. S. sebæ.
16. S. castaneus.

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4. Salarias biseriatus, *Cuv. & Val.* xi. p. 316.—East Indies.
5. —— niger, (*Ehrenb.*), *Cuv. & Val.* xi. p. 327.—Red Sea.
6. —— ruficaudus, (*Ehrenb.*) *Cuv. & Val.* xi. p. 328.—Red Sea.
7. —— guttatus, *Bleek. Sangi*, p. 379; (not *Cuv. & Val.*).—Salarias decussatus, *Bleek. Biliton*, iv. p. 230.—East Indian Archipelago.
8. —— kingii, *Cuv. & Val.* xi. p. 334.—New Holland.
9. —— heteropterus, *Bleek. Act. Soc. Sc. Indo-Nederl.* ii., *Amboina*, p. 65.—Amboyna.
10. Blennius cavernosus, *Bl. Schn.* p. 168. tab. 37. fig. 2.—Salarias cavernosus, *Cuv. & Val.* xi. p. 351.
11. Salarias olivaceus, *Blyth in Journ. As. Soc. Beng.* 1859, p. 271.—Andaman Islands.
12. —— epalzeorhynchus, *Bleek. Natuurk. Tydschr. Nederl. Ind.* xix. p. 344.—Java.
13. —— schultzei, *Bleek. l. c.* p. 345.—Java.—Volume xix. of the journal quoted not having reached this country, I know of the last two species only from Dr. Bleeker's "Enumeratio specierum."

II. Species with the dorsal fin distinctly notched.

a. Without a crest on the head, p. 247.

17. S. variolosus.
18. S. viridis.
19. S. cuvieri.
20. S. textilis.
21. S. marmoratus.
22. S. arenatus.
23. S. vermiculatus.
24. S. rubro-punctatus.
25. S. celebicus.
26. S. guttatus.
27. S. interruptus.
28. S. chrysospilos.
29. S. gibbifrons.
30. S. periophthalmus.
31. S. dussumieri.
32. S. sumatranus.
33. S. hendriksii.
34. S. edentulus.
35. S. goesii.
36. S. æquipinnis.
37. S. diproctopterus.
38. S. nigricans.
39. S. vomerinus.

b. With a crest on the head, p. 254.

40. S. lineatus.
41. S. quadricornis.
42. S. melanocephalus.
43. S. fronto.
44. S. meleagris.
45. S. bellus.
46. S. oortii.
47. S. bilitonensis.
48. S. cyanostigma.
49. S. hasseltii.
50. S. unicolor.

I. Species with the dorsal fin not notched.

a. With a crest on the head.

1. Salarias flavo-umbrinus.

Salarias flavo-umbrinus, *Rüpp. Atl. Fische*, p. 113, and *N. W. Fische*, p. 135. taf. 32. fig. 1.
—— dama, (*Ehrenb.*) *Cuv. & Val.* xi. p. 336.

D. 29. A. 18–19. V. 2.

The height of the body is contained five times and a half in the total length. A crest on the head; a fringed tentacle above the orbit and at the nostril. The dorsal fin is not notched, but the anterior half is considerably lower than the posterior; it is slightly continuous with the base of the caudal fin. Canine teeth none. Brown, irregularly spotted with yellow.

Red Sea.

a. Adult. Red Sea.

2. Salarias oryx.

Salarias oryx, (*Ehrenb.*) *Cuv. & Val.* xi. p. 335.

D. $\frac{12}{22}$. A. 20. V. 3.

The height of the body equals the length of the head, and is one-sixth of the total. A crest on the head; the orbital tentacle is simple and well developed; a very short one on each side of the neck and at the nostril. Canine teeth none. The dorsal fin is scarcely emarginate, low, and slightly continuous with the caudal. Olive: back with darker bands or spots; dorsal with numerous oblique brown streaks.

Red Sea.

a. Adult. Red Sea. Presented by Major Macdonald.

3. Salarias sexfilum.

D. 30. A. 2+17. V. 2.

The height of the body is contained five times and two-thirds in the total length, the length of the head six times and two-thirds. A crest on the head; a filiform tentacle at the nostril, above the orbit, and on each side of the neck, that above the eye being the longest. Canine teeth none. The dorsal fin becomes gradually somewhat higher from the commencement to the posterior third of the soft portion, where it is as high as the body beneath; it is slightly continuous with the caudal. The pectoral extends nearly to the vent. Colours?

Hab. —— ?

a. Discoloured. From the Haslar Collection.

	lines.
Total length	37
Height of the body	$6\frac{1}{2}$
Length of the head	$5\frac{1}{2}$

4. Salarias tridactylus.

Blennius tridactylus, *Bl. Schn.* p. 176.
—— amphibius, *Walbaum, Artedi,* iii. p. 187.
—— saliens, *Lacép.* ii. pp. 458, 479.
Salarias alticus, *Cuv. & Val.* xi. p. 337.
Blennius gobioides, *Forst. Descript. Anim. cur. Lichtenst.* p. 283.

D. $\frac{13-14}{22-20}$. A. 26–27. V. 1/3.

The height of the body is one-ninth or one-tenth of the total length, the length of the head one-sixth. A crest on the head in the male; a very small simple tentacle above the orbit. The dorsal fin is slightly emarginate, higher than the body in specimens with a crest on the head, one-half lower in those without a crest; it does not extend on to the caudal; the upper part of the rays free. Canine teeth small. Bluish, irregularly dotted and spotted with whitish; vertical fins blackish; dorsal with pale oblique streaks.

East Indian Archipelago.

Salarias tetradactylus (Bleek. Biliton, iv. p. 228) appears to be closely allied to the above species.

b. No crest on the head.

5. Salarias atlanticus.

Punaru, *Marcgr.* p. 165.
Salarias atlanticus, *Cuv. & Val.* xi. p. 321; *Jenyns, Zool. Beagle, Fishes,* p. 86; *Lowe, Trans. Zool. Soc.* ii. p. 185 & iii. p. 9.

D. 33–34. A. 24. Vert. 12/22.

The height of the body is contained five times and a half in the total length, the length of the head six times. Anterior profile oblique; the lower canine teeth are exceedingly large, and can be received in a cavity of the palate. Supraorbital tentacle well developed, slender; five or six short tentacles at each nostril, those on the neck very short; crest none. The dorsal fin is not notched; it begins above the middle of the operculum and terminates at the root of the caudal. Uniform brown, or with dark vertical bands. A more or less broad margin of the dorsal, and the upper and lower margins of the caudal whitish; sometimes a round black spot behind the eye.

Sea of Madeira. Caribbean Sea. West coast of Central America.

a, b, c. Fine specimens. Madeira.
d–e. Half-grown. From the Collection of the Zoological Society.
f, g–i. Adult and half-grown. Island of Cordova. Presented by G. U. Skinner, Esq.
k. Young. West coast of Central America. Collected by Captain Dow. Presented by Dr. P. L. Sclater, Secr. Zool. Soc.—This specimen differs somewhat from the others in the number of the fin-rays: D. $\frac{11}{20}$, A. 2+22; it has, moreover, the caudal truncated. Otherwise it is perfectly identical with the Atlantic specimens: it has the whitish margins of the caudal, the black spot behind the eye, &c.
l. Adult: skeleton. Madeira. From the Collection of the Zoological Society.

The *intestinal tract* is more than three times as long as the entire body.

The structure of the *skeleton* is very similar to that of the Blennies; the jaw-bones, however, are still shorter, and the intermaxillary and mandibulary are deeply concave anteriorly. There are twelve abdominal and twenty-two caudal vertebræ, the former portion being only half as long as the caudal.

6. Salarias nitidus.

D. 33. A. 2+22. V. 2.

The height of the body equals the length of the head, and is six times and a half in the total. The forehead projects slightly beyond the snout. A canine tooth in the lower jaw, none in the upper. A slender simple tentacle above each orbit, a small one at the nostril, none on the neck. The dorsal fin is not notched, commences above the operculum and terminates immediately before the caudal; it is lower than the body, but somewhat higher than the anal. Yellowish (in spirits), with eight brown cross-bands; head and body with pearl-coloured, purple-edged dots, those of the head in small number and round, those of the body numerous and oblong. Dorsal fin with brown spots, continued from the bands of the body to the basal half of the fin; the marginal half with two series of white dots. Caudal with four transverse series of white dots. Anal transparent, immaculate, or with a series of white dots along its base.

Chinese Sea.

a–c. China. Presented by Captain Sir E. Belcher, C.B.
d. From the Haslar Collection.

	lines.
Total length	23
Length of the head	$3\frac{1}{2}$
Height of the body	$3\frac{1}{2}$

7. Salarias amboinensis.

Bleek. Act. Soc. Sc. Indo-Nederl. ii., *Amboina*, p. 67.

D. $\frac{13}{19}$. A. 20. V. 2.

The height of the body is contained seven times and two-fifths in the total length, the length of the head six times and two-thirds. No crest on the head or tentacles on the neck; a short fringed tentacle above the orbit, and a simple one at the nostril. Canine teeth none. The dorsal fin is slightly emarginate, and does not extend on to the caudal; the posterior portion is higher than the anterior and than the anal fin, but much lower than the body. Violet, marbled with brownish and greenish; fins yellow: the anterior part of the dorsal marbled with violet, and with a blue spot between the first and second spines; the posterior part with three violet spots at the base; each anal ray with a brown spot. (*Bl.*)

Sea of Amboyna.

8. Salarias rivulatus.

Rüpp. Atl. Fische, p. 114.

D. 34. A. 20.

The height of the body is contained five times in the total length, the length of the head five times and a half. Anterior profile nearly vertical; canine teeth none. A simple and long tentacle above the orbit and a small one at the nostril; none on the neck. The dorsal fin is slightly emarginate, commences in the vertical from the gill-opening, and is continuous with the caudal; the anterior portion is lower than the posterior, but higher than the anal fin. Light brown, with irregular oblong yellowish spots, edged with darker; fins brownish, margin of the dorsal lineolated with darker.

Red Sea.

9. Salarias fasciatus.

Blennius gattorugine, *Forsk. Descr. Anim.* p. 23.
—— fasciatus, *Bl.* ii. p. 111. taf. 162. fig. 1; *Bl. Schn.* p. 168.
Salarias quadripinnis, *Rüpp. Atl. Fische*, p. 112. taf. 28. fig. 2; *Cuv. & Val.* xi. p. 318; *Bleek. Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* p. 19.
—— fasciatus, *Cuv. & Val.* xi. p. 324.
—— priamensis, *Bleek. Sumatra*, ii. p. 268.

D. $\frac{12}{18-19}$. A. 19–21.

The height of the body is contained five times in the total length, the length of the head six times and a half. Anterior profile nearly vertical; canine teeth none. A pair of fringed tentacles above the orbits, another on the nape of the neck; crest none. The dorsal fin is not notched, begins in the vertical from the extremity of the operculum, and is continuous with the caudal fin. The anterior anal rays are sometimes semidetached and elongate. Brown, irregularly variegated, spotted and dotted with yellow and blue; immature specimens with eight brown vertical bands. Throat and chest with three yellowish cross-bands; several whitish spots before the root of the pectoral.

Red Sea. East Indian Ocean and Archipelago. Polynesia.

I have not the slightest doubt that the *Blennius fasciatus* of Bloch is identical with this species. Specimen *b*, from the Philippine Islands, which is slightly discoloured, agrees even somewhat in coloration with the figure given by Bloch, viz. in the spots before the pectoral, the streaks along the sides of the back, the brown cross-bands, &c.

a. Adult. Borneo. Purchased of Mr. Frank.
b. Adult. Philippine Islands.
c. Half-grown. New Holland.
d. Adult. Victoria Bank. Presented by the Lords of the Admiralty.
e–f. Adult. Feejee Islands. Presented by the Lords of the Admiralty.
g–k. Half-grown. Tonga Islands. From the Haslar Collection.
? *l–m*. Adult: skins. Aneiteum. From Mr. Macgillivray's Collection.
n–o, p. Adult.

Variety: Back with several series of small round dots, each with a light centre and a blue edge; the lower part of the sides and the belly with large whitish spots.

q. Adult. Red Sea.

The peritoneum is black. The intestines make several circumvolutions, and are more than three times as long as the fish.

10. **Salarias fuscus.**

Salarias fuscus, *Rüppell, N. W. Fische*, p. 135. taf. 32. fig. 2.
? Salarias frontalis, (*Ehrenb.*) *Cuv. & Val.* xi. p. 328.
Salarias phaiosoma, *Bleek. Batoe*, p. 317.

D. 30. A. (2+) 18.

The height of the body is contained three times and three-fifths or four times in the total length; the forehead projects beyond the mouth. Canine teeth none. A very small tentacle above the orbit. The dorsal is not notched, and slightly continuous with the caudal fin; the first two anal spines small, the three next sometimes free nearly from the base. Brown: pectoral and caudal fins yellow; a black spot at the base of the former.

Massaua (Red Sea). East Indian Archipelago.

a. Half-grown. Amboyna. Purchased of Mr. Frank.
b. Half-grown. From the Haslar Collection.

11. **Salarias nigro-vittatus.**

Rüppell, N. W. Fische, p. 136.

D. 30*. A. 19.

The forehead is prominent beyond the mouth. Canine teeth or tentacles none. The dorsal fin is not notched, even. Brown, with a black longitudinal band.

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* Rüppell states twenty; but this is a misprint, as I have convinced myself by examination of the typical specimen.

Massaua (Red Sea).

12. Salarias cyclops.

Rüppell, Atl. Fische, p. 113. taf. 28. fig. 3, and *N. W. Fische*, p. 134; *Cuv. & Val.* xi. p. 326.

D. 29. A. (2+) 20.

The height of the body is one-fifth of the total length. A short fringed tentacle above the orbit, another simple and small one at the nostril. Canine teeth in both the jaws. The dorsal fin is scarcely notched, and extends on to the caudal. Brownish-yellow: præoperculum dotted with black; a brown ocellated spot on the anterior part of the dorsal.

Red Sea.

13. Salarias ceramensis.

Bleeker, Ceram, ii. p. 701.

D. 29–30. A. 18–19.

The height of the body is contained four times or four times and a half in the total length, the length of the head five times or five times and two-thirds. Anterior profile of the head vertical. A short tentacle above the orbit, another broad, short and fringed one on each side of the occiput. Canine teeth none. Dorsal fin not emarginate. Brown: body and fins with black and blue dots.

Coasts of Celebes, Booroo, and Ceram.

a. Fine specimen. Ceram. Purchased of Mr. Frank.
b. Half-grown. ? Borneo. Purchased of Mr. Frank.

14. Salarias frenatus.

Cuv. & Val. xi. p. 342.

D. $\frac{12}{14}$. A. 18. V. 1/3.

The height of the body is one-seventh of the total length, the length of the head one-fifth. Crest on the head none; a small fringed tentacle above the posterior part of the orbit. The margin of the dorsal fin is even, and the fin is lower anteriorly than posteriorly. The anal fin is as high as the dorsal, and has the last ray free. Greyish: four white lines, edged with bluish, proceed from the throat upwards to the eye; one or two similar lines between the eyes; dorsal with oblique alternate bluish and blackish stripes; similar transverse stripes on the caudal fin; anal bluish, the tips of the rays blackish. (*Val.*)

Coast of Malabar.

15. Salarias sebæ.

?? *Seba*, iii. 30. 5.
? Salarias sebæ, *Cuv. & Val.* xi. p. 323.
Salarias sebæ, *Bleek. Ternate*, vii. p. 373.

D. $\frac{11}{15}$. A. (2+) 15–16.

The height of the body is contained four times and one-third in the total length, the length of the head four times and two-thirds to four times and three-quarters. Nape of the neck with about fifteen short, simple tentacles on each side; a short fringed tentacle above the orbit and at the nostril. A canine tooth in the lower jaw. The dorsal fin is more or less emarginate, and extends on to the caudal; the first ray is the longest, and sometimes much produced; the anal fin is much lower than the dorsal, and the anterior rays are the shortest. Violet, reticulated with blackish; dorsal and caudal brown, red superiorly.

Seas of Ternate, Amboyna, and Goram.

a. Adult. From the Haslar Collection.
b. Amboyna. Purchased of Mr. Frank.

16. **Salarias castaneus.**

Cuv. & Val. xi. p. 324.

D. $\frac{10}{12}$. A. 14.

The height of the body is contained four times and a half in the total length. A very small tentacle above the orbit. Canine teeth in the lower jaw. The dorsal fin is slightly emarginate; the first dorsal ray detached, but not longer than the others. Uniform brown. (*Val.*)

Ile de France.

B. Dorsal fin distinctly notched.

1. No crest on the head.

17. **Salarias variolosus.**

Cuv. & Val. xi. p. 317.

D. 12 | 12. A. 14.

The height of the body is contained four times and a half in the total length. A series of filaments across the neck; a fringed tentacle above the orbit; canine teeth small. Dorsal emarginate, extending on to the caudal. Brown; head punctulated with whitish. (*Val.*)

Sea of Guam.

18. **Salarias viridis.**

Cuv. & Val. xi. p. 344; *Gay, Hist. Chile, Zool.* ii. p. 268.

D. 10 | 17. A. 19. V. 1/3.

The height of the body is contained six times in the total length (in the female four times), the length of the head five times. A long fringed tentacle above the orbit, four flat and ciliated short appendages on the neck. Strong canine teeth in the lower jaw. The dorsal fin is distinctly notched, half as high as the body and higher than the anal. Uniform greyish (in spirits), with the fins blackish. (Green in life.) (*Val.*)

Valparaiso.

19. Salarias cuvieri.

Salarias variolatus, *Cuv. & Val.* xi. p. 346. pl. 330 (not Salarias variolosus); *Gay, Hist. Chile, Zool.* ii. p. 269.

D. 11 | 18. A. (2+) 20. V. $\frac{1}{2-3}$.

The height of the body is contained four times in the total length, the length of the head five times, and that of the caudal fin six times and a third. A long, triangular, fringed tentacle above the orbit; a series of numerous ciliated tentacles on the neck. Lower jaw with very small canines. The dorsal fin is distinctly notched, and the rays of the anterior portion project beyond the membrane; the anal is lower than the dorsal. Brown (in spirits), dotted with white; fins blackish. The dots are red during life. Sometimes uniform brown.

Island of Juan Fernandez.

a, b. Large specimens, nine inches and a half long. Chile. From Mr. Bridges' Collection.

20. Salarias textilis.

Salarias textilis, (*Quoy & Gaimard*) *Cuv. & Val.* xi. p. 307.

D. 12 | 15. A. 16.

The height of the body is contained five times and a half in the total length. A strong canine tooth in the lower jaw; a short tentacle, formed by five filaments, above the orbit; a smaller one on the neck and at the nostril. The dorsal is deeply notched: the anterior portion is not quite one-third of the depth of the body; the second is twice as high, and does not extend on to the caudal. Greenish, with twelve or fourteen brownish-violet cross-bands arranged in pairs, and interrupted by three series of whitish dots; the third series corresponds to the lateral line. A square spot above the pectoral, darker than the bands; dorsal with oblique brown stripes, caudal with vertical series of black dots.

Island of Ascension.

21. Salarias marmoratus.

Blennius marmoratus, *Bennett, Zool. Journ.* iv. p. 35.
Salarias marmoratus, *Cuv. & Val.* xi. p. 305.

D. 12 | 15. A. 18.

The height of the body is contained five times and a half in the total length. A strong canine tooth in the lower jaw; a tentacle half as high as the head, and with some filaments at the base, above the orbit; a small fringed tentacle on the temple, a third one at the nostril. The dorsal is deeply notched, and does not extend to the root of the caudal, the space between the two fins being one-tenth of the total length. Brownish, marbled with darker.

Ceylon. Sandwich Islands.

22. Salarias arenatus.

? Salarias striatus, (*Quoy & Gaim.*) *Cuv. & Val.* xi. p. 309.
Salarias arenatus, *Bleeker, Cocos,* iii. p. 173.

D. 12 | 15. A. 17.

The height of the body is contained seven times in the total length, the length of the head five times and a quarter. A short divided tentacle above the orbit and at the nostril, a very small simple one on each side of the neck. A small canine tooth in the lower jaw. The dorsal fin is deeply notched, and terminates immediately before the caudal; the posterior portion of the dorsal and the anal fin are nearly equal in height, higher than the first dorsal and lower than the body. Body yellowish-rose-coloured, marbled with purple and dotted with violet; a blackish spot above the scapulary region, a blackish transverse band behind the eye; fins yellow, the rays of the dorsal and caudal dotted with brown.

Seas of Sumatra and of the Cocos Islands. (Ile de France?)

a. Adult. From the Collection of the College of Surgeons.

23. Salarias vermiculatus.

Cuv. & Val. xi. p. 301.

B. 6. D. 12 | 15. A. (2+) 18.

The height of the body equals the length of the head, and is one-fifth of the total. The space between the eyes is slightly grooved, and its width equals the diameter of the orbit. A strong canine tooth in the lower jaw; a tentacle with fringed extremity above the orbit, another at the nostril. The dorsal is deeply notched; the anterior portion commences on the neck, and is one-third the depth of the body; the posterior terminates at the root of the caudal. Greyish: head, body, anal and base of the dorsal vermiculated with brown. (*Val.*)

Seychelles; Sunda Sea.

24. Salarias rubro-punctatus.

Cuv. & Val. xi. p. 348; *Gay, Hist. Chile, Zool.* ii. p. 271; *Ictiol. Atl.* lam. 2 bis, fig. 1; *Cuv. Règne Anim. Ill. Poiss.* pl. 77. fig. 3.

D. 11 | 17. A. 20.

The height of the body equals the length of the head, and is one-fifth of the total. The forehead does not project beyond the mouth. A very small tentacle on the neck, a longer fringed one above the orbit. Canine teeth none. The dorsal fin is deeply notched, and does not extend on to the caudal. Brown, marbled with black and dotted with reddish; a black spot on the anterior part of the dorsal; throat with two or three brownish cross-bands.

Island of Juan Fernandez.

a. Fine specimen. Chile. From Mr. Bridges' Collection.—This specimen belongs, perhaps, to a species different from that described by Valenciennes; it has a dark-brown longitudinal band on the side, and no cross-bands on the throat; numbers of the fin-rays: D. $\frac{11}{18}$. A. 19.

25. Salarias celebicus.

Bleeker, Celebes, v. p. 250.

D. 12 | 17. A. 18–19. V. 2.

The height of the body is contained five times and two-thirds in the total length, the length of the head five times. Forehead prominent. A small simple tentacle above the orbit and at the nostril. Canine teeth none. The dorsal is deeply notched, and not united with the caudal; both portions are nearly of equal height, lower than the body, but higher than the anal fin. Greenish, dotted with brown and blue. (*Bl.*)

Coasts of Batu, Celebes, Booroo, and Amboyna.

26. Salarias guttatus.

Cuv. & Val. xi. p. 308.

D. 12 | 17–18. A. 20.

The height of the body equals the length of the head, and is one-sixth of the total. A small simple tentacle above the orbit and on each side of the neck. Canine teeth in the lower jaw. The dorsal fin is one-half notched, and terminates immediately before the root of the caudal. Reddish-grey, above dotted with brown, sides spotted with white; root of the pectoral with some white spots; fins white, the rays brown-spotted. (*Val.*)

Sea of Vanicolo.

27. Salarias interruptus.

Bleeker, Boeroe, ii. p. 68.

D. 12 | 19. A. 21.

The height of the body is contained seven times or seven times and a half in the total length, the length of the head six times. The space between the orbits is rather concave; the forehead does not project beyond the mouth. A short simple tentacle above the orbit and at the nostril. A canine tooth in the lower jaw. The dorsal fin is deeply notched: the anterior portion is rather lower than the posterior, and nearly equal in height to the anal fin; the posterior is somewhat lower than the body. Body with short brown longitudinal streaks; dorsal fin with three or four series of brown spots; caudal dotted with brown; anal with a brown margin. (*Bl.*)

Sea of Kajeli (Buru).

28. Salarias chrysospilos.

Bleeker, Act. Soc. Sc. Indo-Nederl. ii., *Amboina,* p. 66.

D. 12 | 18. A. 19. V. 2.

The height of the body is contained seven times in the total length, the length of the head five times and three-fifths. No crest on the head or tentacles on the neck; a small slender tentacle above the orbit and at the nostril. A strong canine tooth in the lower jaw. The dorsal fin is rather deeply notched, both portions being nearly equal in height, higher than the anal and lower than the body. Violet-rose-coloured with golden spots; fins yellow: the dorsal with an indistinct oblique brownish stripe between the rays; anal brown-edged. (*Bl.*)

Sea of Amboyna.

29. Salarias gibbifrons.

Quoy & Gaim. Voy. Freyc. Poiss. p. 253; *Cuv. & Val.* xi. p. 312 (?); *Bleek. Blenn. en Gob.* p. 256.

D. 12 | 19. A. 21.

The height of the body is contained seven times and a half in the total length, the length of the head six times and three-quarters; the forehead projects considerably beyond the mouth. A simple tentacle, shorter than the eye, above the orbit, another at the nostril. Canine teeth in the lower jaw. The dorsal is deeply notched; the posterior portion and the anal are higher than the anterior and than the body. (Brownish?) (*Bl.*)

Sea of Sumatra. (Sandwich Islands?)

30. Salarias periophthalmus.

Cuv. & Val. xi. p. 311. pl. 328 (bad); *Bleek. Sumatra,* ii. p. 267.

D. 12 | 20. A. 21–22.

The height of the body is contained seven times in the total length, the length of the head six times and a quarter. The forehead does not project beyond the mouth. A short simple tentacle above the orbit; another, which is fringed, at the nostril. Canine teeth in the lower jaw. The dorsal fin is notched nearly to the base, and does not extend on to the caudal; the posterior portion is not quite so high as the body, but higher than the anterior portion and than the anal. Rose-coloured, with indistinct violet cross-bands, and with two series of blue spots along the side; head dotted with red, and with a red transverse band behind the eye. The basal half of the dorsal fins violet, with darker oblique streaks, the upper half yellow, dotted with red; the basal half of the anal orange-coloured, the lower black; caudal red.

Sea of Ticopia. Eastern parts of the East Indian Archipelago.

31. Salarias dussumieri.

Cuv. & Val. xi. p. 310.

D. 12 | 20. A. 22.

The height of the body is one-sixth or one-seventh of the total length. A short fringed tentacle above the orbit and at the nostril. Canine teeth none. The dorsal fin is deeply notched, and extends on to the caudal. Brownish, indistinctly marbled with reddish-brown; the rays of the dorsal and caudal dotted with brown; anal greyish, with blackish margin. (In life green, with rose-coloured dots. *Val.*)

Coast of Malabar. Port Essington.

a. Half-grown: not good state. Port Essington. From the Haslar Collection.

32. **Salarias sumatranus.**

Bleeker, Blenn. en Gob. p. 256.

D. 12 | 20. A. 22.

The height of the body is one-fifth of the total length, the length of the head one-sixth. On each side of the occiput and above the orbit a short simple tentacle; another, which is bifid, at the nostril. Canine teeth none. The dorsal fin is deeply notched, and continuous with the caudal; the posterior portion is lower than the body, but higher than the anterior and than the anal fin. Greyish: the anterior dorsal with blackish longitudinal bands, the posterior with numerous oblique yellow stripes, and superiorly with longitudinal series of black dots; caudal green; anal with two or three series of brown dots. (*Bl.*)

East Indian Archipelago.

33. **Salarias hendriksii.**

Bleeker, Biliton, iv. p. 233.

D. 13 | 20. A. 21.

The height of the body is contained seven times and a half in the total length, the length of the head six times and a quarter. The space between the eyes is concave; the forehead does not project beyond the mouth. A short simple tentacle above the orbit; another, which is fringed, at the nostril. A canine tooth in the lower jaw. The dorsal fin is moderately emarginate, and does not extend on to the caudal; the posterior portion is lower than the body, but higher than the anterior and than the anal. Violet-rose-coloured: body with eight double darker cross-bars; each space between two bars with a violet spot. Dorsal, anal, and caudal fins brown-spotted, the anal with a brownish band near the margin. (*Bl.*)

Coast of Western Biliton.

34. **Salarias edentulus.**

Blennius edentulus, *Bl. Schn.* p. 172.
Salarias forsteri, *Cuv. & Val.* xi. p. 315; *Bleek. Blenn. en Gob.* p. 255.
Blennius truncatus, *Forst. Descript. Anim. cur. Lichtenst.* p. 231.

D. 12 | 21. A. 23.

The height of the body is contained six times and a half in the total length, the length of the head six times. A simple and slender tentacle above the orbit and another at the nostril; the former is as long as the diameter of the eye. Canine teeth none. The dorsal fin is deeply notched, not continuous with the caudal; the anterior portion is scarcely lower than the posterior, which is higher than the anal fin. Greyish, with darker cross-bands: fins yellowish, the rays of the dorsal dotted with brown; anal with a brownish margin; caudal with two or three brown transverse bands.

Polynesia. Eastern parts of the East Indian Archipelago.

35. Salarias goesii.

Bleeker, Act. Soc. Sc. Indo-Nederl. vi., *New Guinea,* p. 19.

D. 14 | 19. A. 20.

The height of the body is one-eighth of the total length, the length of the head one-sixth. A short slightly fringed tentacle above the orbit, another simple one at the nostril. Lower jaw without canine teeth. The dorsal fin is moderately notched, the soft portion being higher than the spinous; it is not continuous with the caudal fin. Violet-rose-coloured with darker dots, which are crowded together on the back, forming cross-bands. Dorsal irregularly spotted with brown; anal and ventrals immaculate; caudal with three transverse series of blackish spots; pectoral with some small black spots on the rays.

Coast of Doreh (New Guinea).

36. Salarias æquipinnis.

D. $\frac{16}{18}$. A. 25. V. 1/2.

The height of the body is nearly one-tenth of the total length, the length of the head one-seventh. Canine teeth none. A very short tentacle above the posterior portion of the orbit, none on the neck. The dorsal fin commences in the vertical from the base of the pectoral, is distinctly emarginate, and terminates before reaching the caudal. In one of the specimens the second dorsal spine is produced into a filament as long as the head, the remainder of the fin being rather lower than the soft portion, which is as high as the body. Caudal rounded, one-sixth of the total length. The pectoral extends nearly to the vent; ventral short, with the outer spine thick, cartilaginous. Dark olive (in spirits), spotted with darker, the spots being arranged in about ten vertical bands. Dorsal fins and caudal rays black. Anal immaculate, with a black marginal band, leaving the free tips of the rays white.

Amboyna.

a, b. Amboyna. Purchased of Mr. Frank.

	lines.
Total length	34
Height of the body	3½
Length of the head	5
Length of the caudal fin	6

37. Salarias diproctopterus.

Bleeker, Boeroe, ii. p. 69.

D. 11–12 | 17. A. $\frac{13}{9}$.

The anal fin is divided by a notch into two portions. The height of the body is contained seven times in the total length, the length of the head six times and two-fifths. A short simple tentacle on the neck, above the orbit, and at the nostril. No canines in the lower jaw. The dorsal fin is deeply notched, and extends on to the caudal. Greenish, marbled with violet; vertical fins dotted with brown. (*Bl.*)

Sea of Kajeli (Buru).

38. Salarias nigricans.

Entomacrodus nigricans, *Gill, Proc. Acad. Nat. Sc. Philad.* 1859, p. 168.

D. 11 | 15. A. 17. V. 3.

The height of the body is contained six or seven times in the total length, the length of the head four times and a half. Head without any tentacle. Dorsal fin notched to the base, free from the caudal. Canine teeth of the lower jaw strong. Uniform blackish. (*Gill.*)

Coast of Barbadoes.

39. Salarias vomerinus.

Cuv. & Val. xi. p. 349; *Jenyns, Zool. Beagle, Fishes,* p. 88. pl. 17. fig. 3.

D. 12 | 15–16. A. 18–19. V. 4.

A series of teeth on the vomer. The height of the body is one-sixth or one-seventh of the total length, the length of the head one-sixth. A short fringed tentacle at the nostril, another behind the eye, and a simple one on each side of the neck. Canine teeth of the lower jaw strong. Greyish: body and caudal fin with darker cross-bands; the anterior dorsal edged with white, the posterior with oblique whitish streaks; tips of the rays of the anal black.

Coast of Bahia. Cape Verde Islands.

b. A crest on the head.

40. Salarias lineatus.

? Salarias lineatus, *Cuv. & Val.* xi. p. 314.
Salarias lineatus, *Bleek. Verhand. Batav. Genootsch.* xxii., *Blenn. en Gob.* p. 18.

D. 12 | 23. A. 25.

The height of the body equals the length of the head, and is one-sixth of the total. A low rounded crest on the crown of the head; a short bifid tentacle above the orbit; canine teeth none. The dorsal fin is deeply notched, and continuous with the caudal. Brownish above, with five to seven brown longitudinal stripes on the sides;

fins brownish; the dorsal with numerous oblique brown stripes; anal yellowish, edged with brown. (*Bl.*)

Coasts of Java.

41. **Salarias quadricornis.**

Cuv. & Val. xi. p. 329. pl. 329; ? *Jenyns, Zool. Beagle, Fishes*, p. 87.

D. 13 | 22. A. (2+) 23–24.

The height of the body equals the length of the head, and is contained five times and a half or six times in the total length. A crest on the head in the male sex; a short simple tentacle on each side of the neck and above the orbit; that situated at the nostril is very small and fringed. Canine teeth none. The dorsal fin is deeply notched, and continuous with the caudal; the two portions are of nearly equal height, lower than the body and higher than the anal. Body generally with eight pairs of brown vertical bands, extending on the dorsal; dorsal with oblique stripes, anal with three (bluish) longitudinal streaks. Sometimes greyish, body and fins dotted with brown; or uniform brown.

Indian Ocean. Chinese Sea. (Keeling Islands?)

a. Adult male.
b. Adult male. China. Presented by Captain Sir E. Belcher, C.B.
c. Half-grown male. China. Presented by Captain Sir E. Belcher, C.B.
d, e, f. Adult males and female. Ceylon.
g. Adult female. Madagascar. Presented by Dr. J. E. Gray.
h. Adult male. Madagascar. Presented by Dr. J. E. Gray.

42. **Salarias melanocephalus.**

Bleeker, Verhand. Batav. Genootsch. xxii., *Blenn. en Gob.* p. 18. fig. 19.

D. 12 | 21. A. 24.

The height of the body is contained six times in the total length, the length of the head from five times and a half to five times and two-thirds. A triangular rounded crest on the occiput; a simple tentacle above the orbit, equal in length to the diameter of the eye. Canine teeth none. The dorsal fin is deeply notched, and continuous with the caudal. Brown; head blackish. (*Bl.*)

East Indian Archipelago.

Perhaps a variety of *Salarias quadricornis*.

43. **Salarias fronto.**

D. $\frac{12}{21}$. A. 2+20.

The height of the body is contained seven times and a half to six times and five-sixths in the total length, the length of the head six times and three-quarters. The forehead projects beyond the mouth; the interorbital space is very slightly concave: a long rounded crest on the head; a short tentacle at the nostril; another simple one, which is longer than the eye, above the orbit; none on the neck. The lower jaw with small canine teeth. The dorsal fin has a notch of moderate depth, and is continuous with the caudal, the posterior rays extending on to the middle of the length of the last-named fin; the anterior portion is lower than the posterior, which is as high as, or higher than, the body beneath; the anal rays are as long as those of the soft dorsal. Colour of the body —? Posterior part of the tail and caudal dotted with white; the soft dorsal with three brownish longitudinal lines; anal uniform brown, darker towards the margin.

Molucca Sea.

a. Java.
b. Moluccas.

	lines.
Total length	47
Length of the head	7
Height of the body	6

44. **Salarias meleagris.**

Cuv. & Val. xi. p. 332.

D. 12 | 20. A. 22. Vert. $\frac{11}{26-27}$.

The height of the body is contained six times or six times and a half in the total length, the length of the head five times and a half. A crest on the head; a fringed tentacle, half as high as the head, above the orbit, another small one at the nostril. Canine teeth none. The dorsal fin is deeply notched, and extends on to the caudal; the posterior portion is lower than the body, and rather higher than the anterior. Greyish, with pairs of indistinct brownish vertical bands and with round white dots; the dorsal with oblique stripes; anal blackish, white-spotted.

Van Diemen's Land. New Holland.

The length of the intestinal tract is twice that of the body.

a–b. Adult and half-grown. New Holland.

45. **Salarias bellus.**

D. 12 | 20–21. A. 22–24.

The height of the body is somewhat more than the length of the head, and one-fifth of the total. The forehead does not project beyond the mouth. A crest on the head; a simple tentacle, shorter than the eye, above the orbit; another small and fringed one at the nostril; none on the neck. Canine teeth none. The dorsal fin is notched nearly to its base: both portions are nearly equal in height, lower than the body and higher than the anal; the soft portion is slightly continuous with the caudal. Brownish (in spirits): body with bluish-white dots, more conspicuous on the posterior parts of the tail; the soft dorsal and the caudal with bluish-white lines, ascending obliquely backwards on the former fin, longitudinal and situated between the rays on the latter. Anal fin black, with three rather irregular series of bluish dots placed between the rays.

Chinese Sea.

a, b, c–e. Adult and half-grown. China Seas. Presented by Captain Sir E. Belcher, C.B.

f, g–h. Adult and half-grown. From the Haslar Collection.

	inches.	lines.
Total length	5	10
Height of the body	1	2
Length of the head	1	1

46. Salarias oortii.

Bleek. Natuurk. Tydschr. Nederl. Ind. i. p. 257. fig. 15, and *Act. Soc. Sc. Indo-Nederl.* iii., *Sumatra,* p. 39.

D. 12 | 19–21. A. 23–24.

The height of the body is contained seven times to seven times and a half in the total length, the length of the head six to seven times. The interorbital space is concave; the forehead does not project beyond the mouth; a rounded crest on the crown of the head; a short fringed tentacle above the orbit and at the nostril. The lower jaw with small canine teeth, which are scarcely visible in young specimens. The dorsal fin is deeply notched, and continuous with the caudal; the posterior portion is as high as the body, and higher than the anterior and than the anal. Rose-coloured, with violet cross-bands arranged in pairs, and broader than the interspaces between; the anterior dorsal violet, with several undulated whitish longitudinal stripes; the posterior dorsal violet, yellow along the middle, with oblique bluish stripes inferiorly, and reticulated with blue superiorly; the anal fin rose-coloured at the base, and violet on the marginal half. Caudal yellow, brownish at the base and margins, the latter reticulated with blue.

Coasts of Western Sumatra and of the Moluccas.

a. Adult. Sumatra.
b. Half-grown. Java.
c. Half-grown. Moluccas.

Dr. v. Bleeker's description of the species, as given above, agrees very well with the specimens in the British Museum; they have, however, the body higher, its depth being one-sixth of the total length.

47. Salarias bilitonensis.

Bleeker, Biliton, iv. p. 231.

D. 12 | 20. A. (2+) 20–21.

The height of the body is contained eight times to eight times and a half in the total length, the length of the head six times and two-thirds to six times and a half. The space between the orbits is concave; forehead not prominent. A crest on the head; a simple tentacle above the orbit and a fringed one at the nostril; a canine tooth in the lower jaw. The dorsal fin is emarginate, and extends on to the caudal; the posterior portion is as high as the body, and higher than the anterior and than the anal. Greenish-rose-coloured: a bluish transverse streak below and another behind the eye; operculum with a blue spot; body with eight or nine brownish cross-bars, and with about ten longitudinal streaks of the same colour; the spinous dorsal with brown, blue-edged spots; the lower half of the soft dorsal with oblique brown streaks, the upper reticulated with violet and blue; anal fin with violet margin and numerous bluish dots.

Coast of Western Biliton.

a. Adult. From the Haslar Collection.

48. **Salarias cyanostigma.**

Bleeker, Verhand. Batav. Genootsch. xxii., *Blenn. en Gob.* p. 18. fig. 18.

B. 6. D. 12 | 22. A. 24.

The height of the body is contained eight times and a half in the total length, the length of the head six times and a half. A triangular rounded crest on the occiput; a simple tentacle above the orbit, longer than the eye. A canine tooth in the lower jaw. The dorsal is notched to the base, and not continuous with the caudal. Greenish, with five or six brown cross-bands and blue dots on the sides; fins brownish. (*Bl.*)

East Indian Archipelago.

49. **Salarias hasseltii.**

Bleeker, Natuurk. Tydschr. Nederl. Ind. i. p. 257. fig. 14, and viii. p. 174.

D. 12 | 23. A. 24–25.

The height of the body is contained seven times and a half to eight times in the total length, the length of the head five times and two-thirds to six times and three-quarters. Male with a rounded crest on the crown of the head; a fringed tentacle, shorter than the eye, above the orbit and at the nostril. Canine teeth none. The dorsal is deeply notched, and continuous with the caudal; the two portions are nearly equal in height, lower than the body and higher than the anal. Violet-rose-coloured, with four or five lighter longitudinal stripes and inconspicuous violet cross-bands; dorsal fin brownish, the lower half with oblique bluish stripes, the margin with a blue, brown and yellow longitudinal band; the anal and caudal are yellow in the female, brownish in the male.

Seas of Java, Sumatra, and the Cocos Islands. Feejee Islands.

a, b. Fine specimens. Feejee Islands. Voyage of the 'Herald.'

50. Salarias unicolor.

Rüppell, N. W. Fische, p. 136.

D. 12 | 17. A. 18–19.

The height of the body is contained five times and a half in the total length. The forehead does not project beyond the mouth. A crest on the head; a long fringed tentacle above the orbit, another short one at the nostril. Canine teeth none. The dorsal fin is deeply notched, not continuous with the caudal, and the anterior portion is lower than the posterior. Uniform brown.

Massaua (Red Sea).

7. BLENNOPHIS.

Blennophis, *Valenc. in Webb & Berthel. Iles Canar. Poiss.* p. 60.
Ophioblennius, *Gill, Proc. Acad. Nat. Sc. Philad.* 1860, p. 103.

The body is moderately elongate, naked; snout of moderate extent; each jaw with four hook-like teeth near the symphysis. One dorsal, emarginate; ventrals jugular, formed by two rays. Pseudobranchiæ present.

Canary Islands.

1. Blennophis webbii.

Valenc. l. c. p. 61. pl. 20. fig. 3.

D. $\frac{10-11}{20-21}$. A. 20–22.

Caudal emarginate.

Canary Islands.

a. Adult.

8. NEOCLINUS.

Neoclinus, *Girard, U. S. Pacif. R. R. Exped. Fishes*, p. 114, and *Proc. Acad. Nat. Sc. Philad.* 1859, p. 56.

Body moderately elongate, covered with small scales; cleft of the mouth wide, the maxillary bone being very much developed, extending beyond the gill-opening, as in *Opisthognathus*. Jaws with a band of small teeth; teeth on the vomer and the palatine bones. Dorsal fin long, continuous, formed by spines and simple rays; ventrals jugular, composed of a small spine, hidden in the skin, and of three rays. Gill-opening wide; air-bladder none.

Coast of California.

1. Neoclinus blanchardi.

Girard, U. S. Pacif. R. R. Exped. Fishes, p. 114.

B. 6. D. 41. A. 31. V. 1/3.

The maxillary extends to the vertical from the origin of the dorsal fin. Two filiform tentacles on the upper posterior region of the orbit; a fringed tentacle at the nostril. Reddish-brown, with dark cross-bands; an ocellated spot between the first and second dorsal rays, another between the seventh and eighth. (*Gir.*)

San Diego, California.

2. **Neoclinus satiricus.**

Girard, Proc. Acad. Nat. Sc. Philad. 1859, p. 57.

B. 6. D. 42. A. 29. V. 1/3.

Head without tentacles. Uniform brownish. (*Gir.*)
Bay of Monterey, California.

9. CEBIDICHTHYS.

Cebidichthys, *Ayres, Proc. Calif. Acad. Nat. Sc.* i. 1855, p. 59.

Body very elongate, covered with minute scales; lateral line distinct; snout obtuse; jaws with conical teeth; villiform teeth on the vomer and the palatine bones. One dorsal fin, with an anterior spinous and a posterior soft portion, both formed by many rays; caudal distinct; ventrals none. Branchiostegals six; gill-opening of moderate width, with the gill-membranes united below the throat.
Western coasts of North America.

1. **Cebidichthys violaceus.**

Apodichthys violaceus, *Girard, Proc. Acad. Nat. Sc. Philad.* 1854, p. 150.
Cebidichthys crista-galli, *Ayres, l. c.* pl. 1. figs. 1–3.
—— violaceus, *Girard, U. S. Pacif. R. R. Exped. Fishes*, p. 121 (pl. 25 *b.* figs. 4, 5).

B. 6. D. $\frac{25}{42}$. A. 42.

Crown of the head with a longitudinal crest; the maxillary reaches to the vertical from the posterior margin of the eye. Uniform brownish-violet: a dark streak from the occiput to the eye; two others across the cheek.
Western coasts of North America.

Girard thinks it possible that this fish is specifically, or at least generically, identical with *Blennius alectrolophus*, Pallas.

10. MYXODES.

Myxodes, *Cuv. Règne Anim.*; *Cuv. & Val.* xi. p. 397.

Body somewhat elongate, covered with small scales; snout of moderate extent; jaws with a single series of teeth, without canines; no teeth on the palate. Dorsal fin long, continuous, formed by many spines and a few soft rays. Ventrals jugular, composed of a small spine, hidden in the skin, and of three rays. Gill-opening wide; six branchiostegals; pyloric appendages absent.
Coast of Chile.

1. **Myxodes viridis.**

Myxodes viridis, *Cuv. & Val.* xi. p. 398; *Gay, Hist. Chile, Zool.* ii. p. 283, *Atlas Ictiol.* lam. 10. fig. 1.
? Myxodes ocellatus, *Cuv. & Val.* xi. p. 400. pl. 335; *Gay, l. c.* p. 285.

B. 6. D. $\frac{36}{6}$. A. $\frac{2}{24}$. V. 3.

The height of the body equals the length of the head, and is one-sixth of the total. Dorsal fin continuous, with the three anterior spines rather remote from the others, which they equal in length. Scales very small. Brownish-green, with some whitish spots on the body and on the vertical fins.

Coast of Chile.

2. Myxodes cristatus.

Cuv. & Val. xi. p. 401; *Gay, l. c.* p. 286.

D. $\frac{37}{4}$. A. $\frac{2}{26}$. V. 3.

The three anterior dorsal spines longer than the others. Greyish, spotted with black; dorsal fin with eight blackish spots. (*Val.*)

Coast of Chile.

11. HETEROSTICHUS.

Heterostichus, *Girard, Proc. Acad. Nat. Sc. Philad.* 1854, p. 143, and *U. S. Pacif. R. R. Exped. Fishes*, p. 36*.

Body somewhat elongate, covered with small scales, compressed; snout rather produced, with the lower jaw longest. Canine teeth in the jaws, villiform teeth on the vomer and the palatines. Dorsal fin long, continuous, the spines being much more numerous than the rays. Ventrals jugular, composed of a short spine and three rays. Six branchiostegals.

Coast of California.

1. Heterostichus rostratus.

Girard, l. c. pl. 13.

D. $\frac{37}{13}$. A. $\frac{2}{34}$.

Snout very much depressed and concave; the first five dorsal spines are separated by a notch from the rest of the fin.

San Diego.

12. CLINUS†.

Clinus, sp., *Cuv. Règne Anim.*; *Cuv. & Val.* xi. p. 352.

Cirrhibarbis, *Cuv. & Val.* xi. p. 406.

Labrosomus, Gobioclinus, Blennioclinus, Auchenionchus, Malacoctenus, Calliclinus, et Ophthalmolophus, *Gill, Proc. Acad. Nat. Sc. Philad.* 1860, p. 102.

Body moderately elongate, covered with small scales; snout rather short; a narrow band or sometimes a single series of small teeth in the jaws and on the palate. Dorsal fin long, formed by many spines and a few rays, without a detached anterior portion; anal spines two; ventrals jugular, composed of a small spine, hidden in the skin, and of two or three rays. Tentacle above the orbit more or less developed. Gill-opening wide; pseudobranchiæ; branchiostegals six; air-bladder and pyloric appendages absent.

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* Before we had an opportunity of seeing the figure of this fish, we placed it as an appendix to the *Trachinidæ* (vol. ii. p. 264), to which family it had been referred by Girard. That figure, which is stated to be "very accurate," represents the ventral fins thoracic, whilst, according to the text, they are "situated much in advance of the insertion of the pectorals."

† 1. Clinus peruvianus, *Cuv. & Val.* xi. p. 383.—Peru.

2. —— elegans, *Cuv. & Val.* xi. p. 388. pl. 333; *Gay, Hist. Chile, Zool.* ii. p. 279.—Valparaiso.

Seas of the temperate regions; Atlantic coasts of Tropical America.

The viviparous nature of these fishes was known long before the time of Cuvier, Bloch having verified it in *Clinus superciliosus* (Bl. Schn. p. 170).

1. Clinus nuchipinnis.

Clinus nuchipinnis, *Quoy & Gaim. Voy. Uranie, Zool.* p. 255.
—— pectinifer, *Cuv. & Val.* xi. p. 374; *Casteln. Anim. nouv. ou rares, Poiss.* p. 26.
—— capillatus, *Cuv. & Val.* xi. p. 377.
Lepisoma cirrhosum, *Dekay, New York Fauna, Fishes,* p. 41. pl. 30. fig. 94.
Labrosomus pectinifer, *Gill, l. c.* pp. 21 & 105.
—— capillatus, *Gill, l. c.* p. 107.

D. $\frac{18-19}{12}$. A. $\frac{2}{20}$. V. 1/3. Vert. 12/22.

The height of the body is contained three times and two-thirds or four times in the total length, and equals the length of the head. The snout is of moderate extent, rounded, with the lower jaw somewhat the longer. The vomerine teeth form an angular band; the band on the palatine bones rather short. The interorbital space is rather flat, and its width is less than, or equal to, the diameter of the orbit. A small fringed tentacle at the nostril; that above the orbit is short, but broad, formed by many hair-like filaments (in old specimens very small). On each side of the neck a long series of hair-like filaments. Scales rather small, more or less irregularly arranged. The dorsal fin is continuous, and has the soft portion nearly twice as high as the spinous; spines of moderate strength. Dorsal not united with the caudal. Brown or brownish, with more or less distinct darker vertical bands; generally a black, sometimes white-edged spot on the operculum. Fins and cheeks sometimes dotted with brown.

Coast of Gorea. Atlantic coasts of Tropical America.

a. Half-grown. West Indies. From Mr. Scrivener's Collection.
b. Adult: skin. Jamaica. Purchased of Mr. Cuming.

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3. Clinus canariensis, *Valenc. in Webb & Berth. Iles Canar. Poiss.* p. 60. pl. 17. fig. 3.—Canary Islands. This species, very insufficiently described, is probably provided with tentacles, although the figure does not show any.
4. —— fasciatus, *Casteln. Anim. nouv. ou rares, Poiss.* p. 26. pl. 12. fig. 2.—Rio de Janeiro. Very insufficiently described, and probably also provided with tentacles.
5. —— fernandezianus, *Guichen. in Gay, Hist. Chile, Zool.* ii. p. 282.—Island of Juan Fernandez.

c. Ten inches long. From the Haslar Collection.
d, e. Adult and half-grown.
f. Adult male: skeleton. From the Collection of the Zoological Society.

The intestinal tract is not quite so long as the body. The liver is large, not divided into lobes, and occupies the middle of the abdominal cavity.

Skeleton.—The skeleton resembles much that of the Blennies in the most essential points. The single parts are well ossified and solid. The crown of the head is much less compressed than in *Blennius,* the frontal bones not having any crest. The occipital surface is gently inclined backwards, with a very slight central and lateral crest. The interorbital space is narrow, flat, rugose, its width being nearly one-third of that of the orbit; nasal bones rather long, solid, forming together an X-like figure. Jaw-bones strong, but not so broad as in *Blennius*; the maxillary is much longer than the intermaxillary, and dilated at its extremity. Infraorbital ring strong, without sutures between the single bones of which it is originally composed. Bottom of the tympanic groove entirely osseous. Præoperculum crescent-shaped, operculum triangular; suboperculum with a notch to receive the lower angle of the operculum; interoperculum narrow. The coracoid has a very peculiar form, both its extremities being dilated into broad lamellæ, whilst the middle is thin and styliform. Radius and ulna considerably shorter than the lower pair of the four carpal bones. The pubic bones form together a short tube, which is fixed behind the humeral symphysis.

There are twelve abdominal and twenty-two caudal *vertebræ,* the latter portion being twice as long as the abdominal; the vertebræ are compressed, rather higher than long; the processes and ribs of moderate length and strength, the latter with long epipleurals.

2. **Clinus xanti.**

Labrosomus xanti, *Gill, Proc. Acad. Nat. Sc. Philad.* 1860, p. 107.

D. $\frac{18}{13}$. A. $\frac{3}{18}$. V. 3.

The height of the body is rather less than the length of the head, which is one-fourth of the total. Vomerine and palatine teeth. Superciliary tentacle multifid; one or two transverse rows of filaments across the nape. The dorsal commences behind the vertical from the præoperculum, and the spines gradually increase in height towards the middle of the spinous portion, and thence slightly decrease towards the soft portion, which is nearly twice as high as the last spine. Brown, with about ten darker cross-bars; head with blackish dots; two oblique bands proceed from the orbit to the præoperculum. Dorsal with a blackish basal spot between the first and third spines. (*Gill.*)

Cerro Blanco (Mexico).

3. Clinus herminieri.

Blennius herminieri, *Lesueur, Journ. Acad. Nat. Sc. Philad.* iv. 1825, p. 361.
Clinus herminieri, *Cuv. & Val.* xi. p. 380.
Labrosomus herminieri, *Gill, l. c.* p. 108.

D. $\frac{16}{11}$. A. 20. V. 3.

Palatine and vomerine teeth. Superciliary tentacle formed by fine filaments; others on the neck; dorsal fin with an elongate black spot anteriorly. (*Les.*)

St. Bartholomew's Island (West Indies).

4. Clinus delalandii.

Clinus delalandii, *Cuv. & Val.* xi. p. 378.
Malacoctenus delalandii, *Gill, Proc. Acad. Nat. Sc. Philad.* 1860, p. 103.

D. $\frac{20}{10-11}$. A. $\frac{-}{19}$. V. 3.

The height of the body is contained five times and a half in the total length, the length of the head four times; the snout is somewhat produced. Teeth in the jaws* and on the vomer in a single series; palatine teeth none. A slender forked tentacle above the orbit; on each side of the neck a series of very fine tentacles. The dorsal fin is concave after the third and after the nineteenth spine, and is not continuous with the caudal; spines rather stout. Scales rather small. Greyish, marbled and dotted with black; sometimes with dark vertical bands, extending on the dorsal fin.

Coasts of Brazil and Nicaragua. Pacific coast of Central America.

a–c. Fine specimens. Island of Cordova. Presented by G. U. Skinner, Esq.
d. Adult. Pacific coast of Central America. Collected by Captain Dow; presented by Dr. P. L. Sclater, Secr. Zool. Soc.

5. Clinus brachycephalus.

Clinus brachycephalus, *Cuv. & Val.* xi. p. 371.
Blennioclinus brachycephalus, *Gill, l. c.* p. 103.

D. $\frac{29}{11}$. A. $\frac{2}{24}$. V. 1/2.

The length of the head is contained five times and a half in the total. Snout short, convex; aspect blennioid. Orbital tentacle none. Teeth villiform. The dorsal fin has no separate anterior division, and is low, the soft part being higher than the spinous. Greyish-brown, with two series of alternate broad cross-bands which are composed of white dots; there are seven or eight in each series, the upper ones extending on the dorsal; sides of the head with white dots; eight or ten bluish spots along the anal fin. (*Val.*)

Cape of Good Hope.

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* Valenciennes mentions a band of villiform teeth behind the anterior series; but it is not to be found in our specimens.

6. Clinus geniguttatus.

Clinus geniguttatus, *Cuv. & Val.* xi. p. 386; *Gay, Hist. Chile, Zool.* ii. p. 276.
Calliclinus geniguttatus, *Gill, l. c.* p. 103.

D. $\frac{25}{11}$. A. $\frac{2}{21}$. Vert. $\frac{13-14}{27}$.

The height of the body is contained four times and two-thirds in the total length, the length of the head four times. The snout is of moderate extent, rounded, with the lower jaw somewhat projecting beyond the upper. The vomerine and palatine teeth form rather narrow bands. A short broad fringed tentacle on each side of the neck, above the orbit, and at the nostril; sometimes another single one in front of the dorsal fin. Scales small. The dorsal fin is continuous, and does not extend on to the caudal; the soft portion is considerably higher than the spinous. Spines of moderate strength. Brownish (in spirits); back with five blackish cross-bands, extending on the dorsal fin; cheeks, pectoral, and the lower part of the sides dotted with dark brown. Sometimes uniform brownish, fins blackish.

Coast of Chile.

a, b–c. Fine specimens. Valparaiso. From Mr. Bridges' Collection.
d. Adult: skeleton. Valparaiso. From Mr. Bridges' Collection.

The bones of the *skeleton* are somewhat less solid than in *Cl. nuchipinnis*: the crown of the head is convex, rugose, without a crest; the interorbital space is very narrow, its width being about one-fifth of that of the orbit. The length of the abdominal portion of the vertebral column is to that of the caudal as 1 : 1·84.

7. Clinus variolosus.

Clinus variolosus, *Cuv. & Val.* xi. p. 381. pl. 332; *Cuv. Règne Anim. Ill. Poiss.* pl. 78. fig. 1; *Gay, Hist. Chile, Zool.* ii. p. 273.
Auchenionchus variolosus, *Gill, l. c.* p. 103.

D. $\frac{24}{10}$. A. $\frac{2}{21}$. V. 3.

The height of the body is one-fifth of the total length, the length of the head one-fourth. Vertex very convex; lips thick and fleshy. A broad band of villiform teeth in the upper jaw, and a narrow one in the lower; the teeth of the outer series are enlarged; the vomer and each of the palatine bones are armed with a broad disk of teeth. A short fringed tentacle posteriorly above the orbit; that on the neck very short, like a papilla. Scales small. The dorsal fin is continuous, and does not extend on to the caudal; the soft portion is higher than the spinous. Yellowish, dotted with brownish-black, the dots being accumulated at the base of the dorsal and forming four large spots; the inside of the mouth and the tongue with black dots; anal with large spots.

Valparaiso.

This species, like *C. geniguttatus*, attains to the size of ten inches; it is called 'Trambayo.'

8. Clinus guttulatus.

Cuv. & Val. xi. p. 387; *Gay, Hist. Chile, Zool.* ii. p. 278. lam. 5 bis, fig. 4.

$D. \frac{25}{12}. \quad A. \frac{2}{21}.$

The height of the body is contained six times and a half in the total length, the length of the head four times. Snout somewhat produced. A small fringed tentacle above the orbit; those at the nostril and on the neck very small, scarcely perceptible. The dorsal fin is continuous. Uniform brown (in spirits); back, vertical fins and pectorals dotted with red (during life).

Valparaiso.

9. Clinus microcirrhis.

Cuv. & Val. xi. p. 384; *Gay, Hist. Chile, Zool.* ii. p. 275.

$D. \frac{26}{12}. \quad A. \frac{2}{23}. \quad V. 3.$

The height of the body is one-fifth of the total length, the length of the head one-fourth. The upper surface of the head covered with warts. Narrow bands of teeth on the vomer and the palatine bones. The dorsal fin is continuous and enveloped in moveable skin. Tentacles above the orbit none; those at the nostril and on the neck minute. Brownish, marbled with darker.

Valparaiso.

10. Clinus crinitus.

Jenyns, Zool. Beagle, Fishes, p. 90. pl. 18. fig. 1; *Gay, Hist. Chile, Zool.* ii. p. 280.

$B. 6. \quad D. \frac{26}{11}. \quad A. \frac{2}{24}. \quad V. 3.$

The height of the body is one-fifth of the total length, the length of the head one-fourth. A triangular patch of teeth on the vomer, and a smaller one on each palatine bone. Eight short bristles above the orbit; a short fringed tentacle on each side of the neck, another at the nostril. Dorsal fin continuous, with the soft portion rather higher than the spinous. Blackish-brown, indistinctly spotted with black. (*Jen.*)

Coquimbo (Chile).

11. Clinus macrocephalus.

$D. \frac{22}{12}. \quad A. \frac{2}{24}. \quad C. 13. \quad P. 13. \quad V. 1/3.$

The height of the body is contained seven times and a half in the total length, the length of the head five times. The head is depressed, rather short, nearly as broad as long; crown of the head broad and flat; interorbital space concave, narrower than the orbit. Snout very short, obtuse, rounded; the maxillary does not extend to behind the posterior margin of the orbit; lips thick. The teeth in the jaws form a band with an outer series of stronger ones; vomerine teeth in a narrow band; palatine teeth none. No orbital tentacles; those at the nostril and on the neck very small. Gill-openings wide, the gill-membranes being united at the throat. Head naked; scales on the body not very small, cycloid. The dorsal fin commences at the occiput, and terminates near the base of the caudal: the spines are flexible, and much lower than the soft rays; the three anterior ones are rather more remote from one another than the following: none of the rays of this or of the other fins are branched. Caudal rounded. The anal is higher posteriorly than anteriorly, about as high as the spinous dorsal. Pectoral rounded, with the middle rays longest, shorter than the head. Ventrals jugular, half as long as the pectoral, with the spine and the outer ray enveloped in a common thick membrane. Dark greyish-olive: head and fins blackish; head, base of the pectoral, anterior part of the body, and dorsal, dotted with white.

Pacific coast of Central America.

a. Fine specimen. From Captain Dow's Collection; presented by Dr. P. L. Sclater, Secr. Zool. Soc.

	lines.
Total length	61
Height of the body	8
Length of the head	12
Greatest width of the head	11
Depth of the head	7½
Length of the caudal fin	10
——— of the pectoral fin	10½

12. Clinus latipinnis.

Clinus latipinnis, *Cuv. & Val.* xi. p. 394.
Ophthalmolophus latipinnis, *Gill, l. c.* p. 104.

$$\mathrm{D.}\ \frac{34}{9}.\quad \mathrm{A.}\ \frac{2}{26}.\quad \mathrm{V.}\ 2.$$

The height of the body is one-sixth of the total length, the length of the head one-fifth. A short fringed tentacle above the orbit. The dorsal fin extends on to the caudal, is continuous, and has the soft portion higher than the spinous. Brown, sometimes with indistinct dark cross-bars; rays of the caudal and pectoral fins dotted with brown. (*Val.*)

Cape of Good Hope.

13. Clinus gobio.

Clinus gobio, *Cuv. & Val.* xi. p. 395.
Gobioclinus gobio, *Gill, l. c.* p. 103.

$$\mathrm{B.}\ 6.\quad \mathrm{D.}\ \frac{18}{9}.\quad \mathrm{A.}\ \frac{2}{17}.\quad \mathrm{V.}\ 2.\quad \mathrm{L.\ lat.}\ 30.\quad \mathrm{L.\ transv.}\ 10.$$

Head large and broad, its length being contained three times and a half in the total; the height of the body is four times and a half in it. Eye large, two-fifths of the length of the head; the width of the interorbital space is one-half of the diameter of the eye. Tentacle above the orbit very small, sometimes absent. Snout short, with the anterior profile subvertical. Vomerine and palatine teeth.

Scales of moderate size; the lateral line disappears above the extremity of the pectoral fin. Reddish-grey, marbled with brown. (*Val.*)
Caribbean Sea.

Probably the type of a separate genus.

14. Clinus superciliosus.

Seba, iii. p. 90. tab. 30. figs. 3, 4; ? iii. 30. 8.
Blennius superciliosus, *L. Syst.* i. p. 442; *Bl.* taf. 168; *Bl. Schn.* p. 170; *Lacép.* ii. pp. 458, 470.
? Blennius mustelaris, *L. Mus. Ad. Fried.* p. 69. pl. 31. fig. 3, and *Syst.* i. p. 443.
?? Blennius cinereus, *L. Mus. Ad. Fried.* p. 69.
Blennius, sp., *Gronov. Mus. Ichth.* ii. p. 21. no. 172. tab. 5. fig. 5, and *Zoophyl.* no. 258.
? Blennius, sp., *Gronov. Zoophyl.* no. 261.
Blennius capensis, (*Forster*) *Bl. Schn.* p. 175; *Forst. Descript. Anim. cur. Licht.* p. 408.
? Blennius spadiceus, *Bl. Schn.* p. 172.
Blennius punctulatus, *Lacép.* ii. pp. 460, 506. pl. 12. fig. 3.
—— mustela, *Lacép.* ii. pp. 459, 484, 486.
Clinus superciliosus, *Cuv. & Val.* xi. p. 360. pl. 331.
Blennius mycterizans, *Gronov. Syst. ed. Gray,* p. 97.
? Blennius ignobilis, *Gronov. Syst. ed. Gray,* p. 98.
Blennius mustellaris, *Gronov. Syst. ed. Gray,* p. 98.

D. $\frac{34-40}{9-5}$. A. $\frac{2}{23-29}$. V. 1/2. Vert. 18/31.

The height of the body is contained four times and a half or five times in the total length, the length of the head four times. The snout is rather short. A short fringed tentacle above the orbit. Scales exceedingly small, those of the anterior portion of the lateral line larger. The three anterior dorsal spines are generally stronger and longer than the others and somewhat remote from them, although the connecting membrane is not notched. The soft portion is more elevated than the spinous, and not united with the caudal. Greyish, brownish, or yellowish; uniform or with darker spots and blotches; sometimes an ocellated spot on the operculum, and a black one on the anterior part of the dorsal. (*Val.*)

a. Large specimen: bad state: has been in chloride of zinc. Cape of Good Hope. Purchased of Mr. Frank.
b–g. Adult: stuffed. Cape of Good Hope.
h–l. Adult: skins. From Gronow's Collection.

For want of fresh specimens I am unable to sift the synonymy, which appears to refer to very different species. Valenciennes, who has examined a great many specimens, thinks that the species is subject to considerable variations, and that the different specific denominations partly relate to them, and are partly derived from specimens badly preserved or figured. Gronovius, however, in his last work (to which Valenciennes has not had access), says, at the end of the descriptions of his three species, "*Ab incautis facile tres hæ species confundi queunt*;" and his *B. ignobilis* may be identical with the *Clinus acuminatus* of Valenciennes. Three specimens from Gronow's Collection have the anterior dorsal rays elevated: whether the fourth is the type of *B. ignobilis* is not certain.

15. **Clinus acuminatus.**

Cuv. & Val. xi. p. 370.

D. $\frac{32}{6}$. A. $\frac{2}{22}$. V. 1/2.

The height of the body is contained four times and a half in the total length, the length of the head four times. The snout is subconical, and equal in length to the diameter of the eye; the interorbital space is narrow and convex. A very short tentacle above the posterior part of the orbit. Scales exceedingly small, those of the anterior portion of the lateral line larger. The anterior dorsal spines nearly equidistant from one another and shorter than the succeeding; the soft portion is a little more elevated than the spinous, and not united with the caudal. Brown: two oblique band-like dark spots from the eye to the angle of the præoperculum.

Cape of Good Hope.

a. Cape Seas. Presented by Sir A. Smith.

16. **Clinus capensis.**

Cirrhibarbis capensis, *Cuv. & Val.* xi. p. 406. pl. 337.

B. 6. D. $\frac{43}{8}$. A. $\frac{2}{33}$. V. 3.

Chin with eight barbels; a pair of branched tentacles above the snout, and a small single one above the orbit. Dorsal fin without a detached portion and with the soft rays not branched. Teeth on the vomer, none on the palatine bones; scales very small.

Cape of Good Hope.

a. Adult: stuffed.

17. **Clinus cottoides.**

Cuv. & Val. xi. p. 367.

D. $\frac{32-34}{6}$. A. $\frac{2}{22}$. V. 1/2. Vert. 16/30.

The height of the body is contained four times and a half in the total length, and equals the length of the head. The snout is short and rounded, with the jaws equal in length. Palatine teeth none, those of the vomer in a curved band. The width of the interorbital space is equal to, or somewhat less than, the diameter of the eye. A broad fringed tentacle, shorter than the eye, above the orbit; a transverse groove behind the orbits. Scales exceedingly small; those of the lateral line larger, square. The dorsal fin continuous, anteriorly low, posteriorly becoming gradually higher; spines stout, the two or three anterior equal in length to the diameter of the eye. Dorsal not united with the caudal. Yellowish-brown, marbled with darker; sometimes six brown vertical bands, extending on the dorsal and anal fins. Chin and the lower part of the opercles with whitish spots.

Cape of Good Hope.

a, b. Adult. Cape.

18. **Clinus heterodon.**

Cuv. & Val. xi. p. 394.

D. $\frac{30}{6}$. A. $\frac{2}{21}$.

The height of the body is contained four times and a half in the total length. Teeth of the jaws in a single series, except in the middle, where they form a group. Tentacles none. The dorsal extends on to the base of the caudal, is continuous, and has the soft portion higher than the spinous. Brown. (*Val.*)

Cape of Good Hope.

19. **Clinus nematopterus.**

D. $\frac{32}{5}$. A. $\frac{2}{20}$. V. 2.

The nine anterior dorsal spines terminate in a lobe which is composed of filaments.

Sea of China.

a. Sea of China. Presented by Captain Sir E. Belcher, C.B.

Description of the specimen.—The height of the body is contained five times in the total length, the length of the head four times and a fourth. The snout is somewhat shorter than the diameter of the eye, which is contained three times and a half in the length of the head. The jaws are equal in length anteriorly, and the maxillary reaches to the vertical from the centre of the eye. The jaws and the vomer are armed with villiform teeth, the palatine bones are smooth. The interorbital space is flat, and its width is one-half the horizontal diameter of the eye. Nostril and the superciliary margin with a fringed tentacle of moderate length; none on the neck. There are series of very distinct pores along the usual course of the system of muciferous channels. Pseudobranchiæ; a very small foramen behind the fourth gill, at its inferior portion. The dorsal fin commences immediately behind the occiput: the four anterior spines increase somewhat in length, the remainder being nearly of equal height, except the six posterior, which again become gradually a little longer; the two anterior soft rays exceed the last spine somewhat in length; the last ray is fixed to the back of the tail by a membrane, which is not continued on the caudal fin. The nine anterior dorsal spines are provided with a skinny lobe composed of filaments, and fixed posteriorly to the top of the spine. The caudal fin is subtruncated, and composed of thirteen simple rays. The anal fin commences in the vertical from the sixteenth dorsal spine, and is much lower than the dorsal; the rays are simple. The pectoral is rounded, and extends to the origin of the anal. The ventral is composed of one small spine, which is hidden, and two rays, the interior of which is the longer; it is inserted on the throat, and does not reach to the vent. The anal papilla is distinct. The scales are exceedingly small, imbedded in the skin, and hardly visible; the lateral line makes a strong curve downwards behind the pectoral, and then runs straight along the middle of the side. The colour is now uniform yellowish.

	lines.
Total length	36
Height of the body	7
Length of the head	8½
Diameter of the eye	2⅔
Length of the last dorsal spine	4

20. Clinus dorsalis.

Bleeker, Cape of Good Hope, p. 24.

B. 6. D. $\frac{45}{1}$. A. $\frac{2}{27}$. V. 3.

The height of the body is contained seven times in the total length, the length of the head five times and two-fifths. Snout nearly as long as the orbit. A short simple tentacle above the orbit and a small one at the nostril. Scales rudimentary. Dorsal fin without anterior division; its last ray is scarcely connected with the base of the caudal fin. Uniform yellow. (*Bl.*)

Cape of Good Hope.

21. Clinus anguillaris.

Cuv. & Val. xi. p. 390. pl. 334.

B. 6. D. $\frac{49}{4}$. A. $\frac{2}{35}$. V. 1/3. Vert. 19/39.

The height of the body is one-eighth of the total length, the length of the head one-sixth. The snout is of moderate extent. A short fringed tentacle above the orbit and a very small one at the nostril. Scales exceedingly small. The dorsal fin is continuous with the caudal, without separate division, but the four anterior spines are somewhat remote from each other. Brownish, marbled with darker.

Cape of Good Hope.

a. Adult: stuffed.

22. Clinus despicillatus.

? Clinus perspicillatus, *Cuv. & Val.* xi. p. 372.
Clinus despicillatus, *Richards. Zool. Journ.* 1839, p. 90, and *Trans. Zool. Soc.* iii. p. 128. tab. 6. fig. 2.

D. 3 | $\frac{33}{4}$. A. $\frac{2}{25}$. V. 1/3.

The height of the body is contained five times and two-thirds in the total length, the length of the head four times and a half. The snout is rather short, subconical, with the jaws equal. Palatine teeth none; those of the vomer form an angular band, narrowest in the middle. The interorbital space is convex, and its width is equal to the vertical diameter of the eye; a small branched tentacle above the orbit. Scales exceedingly small. The three anterior dorsal spines are remote from, but connected by a membrane with, the others; they are not elevated, the height of the dorsal being one-third of that of the body; spines rather slender. Dorsal slightly contiguous with the caudal. Greyish-brown (sometimes with a round black, yellow-edged spot on each side of the neck: *Cl. perspicillatus*); six brown cross-bars on the back; a pair of brown spots at the root of the caudal.

Port Western and Port Arthur.

a. Adult: somewhat discoloured. Port Arthur. From the Haslar Collection.—Type of *Clinus despicillatus*.

13. CRISTICEPS*.

Clinus, sp., *Cuv. & Val.* xi. p. 352.
Cristiceps, *Cuv. & Val.* xi. p. 402.

Body moderately elongate, covered with small or rudimentary scales. Snout rather short, with the cleft of the mouth of moderate width. A band of small teeth in the jaws; teeth on the vomer. Two separate dorsals: the anterior short, formed by three spines; the posterior long, most of the rays being unarticulated. Ventrals jugular, composed of one spine and two or three rays. Head generally with tentacles. Gill-opening wide; branchiostegals six. Pyloric appendages none.—Viviparous.

Mediterranean. South coast of Java. Coasts and rivers of Australia and Tasmania.

Cuvier has founded a separate genus for an Australian fish, *Cristiceps australis*, on account of its anterior dorsal fin being a little more remote from the posterior than in the Mediterranean species, and because he did not see the scales; these, however, are present, as in the species of the genus *Clinus*, although they are very small and rudimentary. The species of *Clinus* and *Cristiceps* form one natural genus; but if they be divided, it is far better to take as the distinguishing character the structure of the dorsal fin. In one of the groups (*Clinus*) the dorsal is continuous, whilst in the other (*Cristiceps*) the three anterior spines are detached, forming an entirely separate fin.

1. Cristiceps argentatus.

Blennius argentatus, *Risso, Ichth. Nice*, p. 140.
—— audifredi, *Risso, Ichth. Nice*, p. 139.
Clinus argentatus, *Risso, Eur. Mérid.* iii. p. 238.
—— testudinarius, *Risso, Eur. Mérid.* iii. p. 239.
—— virescens, *Risso, Eur. Mérid.* iii. p. 239.
—— audifredi, *Risso, Eur. Mérid.* iii. p. 240.
—— mutabilis, *Cocco, Giorn. Sc. Lett. e Arti Sicil.* Avril 1833, xlii. p. 9. tab. 42. fig. 2.
—— argentatus, *Cuv. & Val.* xi. p. 354; *Guichen. Explor. Algér. Poiss.* p. 74.

B. 6. D. $3 \left| \frac{29-30}{3-4} \right.$. A. $\frac{2}{19-23}$. V. 1/2.

The height of the body is contained six times in the total length, the length of the head five times and a third. The snout is of moderate extent, subconical, with the lower jaw somewhat prominent. Palatine teeth none. The width of the interorbital space is less than the diameter of the eye; a small simple tentacle above the orbit. Scales exceedingly small. A short detached dorsal fin on the nape of the neck; the spines by which it is formed are slender, and rather longer than those of the remaining fin; the latter not emarginate, united with the base of the caudal. Brown or yellowish, more or less spotted and marbled with darker; generally a series of whitish or yellowish spots along the sides.

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* 1. Clinus Dubuis, (*Casteln.*) *Bleek. Cape of Good Hope*, p. 23.

Mediterranean. Cape of Good Hope. Coast of Australia.

α. European and African specimens, with nineteen or twenty soft rays in the anal fin.

a, b. Adult. Coast of Dalmatia.
c. Adult: skin. Mediterranean. From Mr. Yarrell's Collection.
d. Adult. Sicily. Presented by W. Swainson, Esq.
e–g. Adult. Cape of Good Hope.

β. Australian specimens, with twenty-three soft rays in the anal fin*.

h. Adult. Port Jackson. Purchased of J. Gould, Esq.
i–m. Adult and half-grown: dried. Freycinet's Harbour. Voyage of the 'Herald.'
? *n–o*. Adult: not good state. Dredged in from two to four fathoms on sandy ground. Gages Road, Swan River. Presented by the Earl of Derby.

2. Cristiceps xanthosoma.

Clinus xanthosoma, *Bleeker, Java,* iv. p. 340.

$$\text{B. } 6. \quad \text{D. } 3 \left| \frac{27}{4}. \right. \quad \text{A. } \frac{2}{21}. \quad \text{V. } 3.$$

The height of the body is five times and a quarter to five times and a half in the total length, the length of the head five times to five times and a quarter. The snout is subconical, shorter than the eye, with the jaws equal in front. Vomerine and palatine teeth. The width of the interorbital space is one-half the diameter of the eye; a small fringed tentacle above the orbit, another at the nostril. Scales rudimentary. A short detached dorsal fin on the nape of the neck; it is higher than the spinous portion of the second fin; the soft portion united with the caudal. Uniform yellow. (*Bleek.*)

Sea of Karangbollong (South Java).

3. Cristiceps nasutus.

$$\text{D. } 3 \left| \frac{28}{4}. \right. \quad \text{A. } \frac{2}{21}. \quad \text{V. } 1/3. \quad \text{P. } 13. \quad \text{C. } 9.$$

The height of the body is contained five times and a half in the total length, the length of the head four times and a half. The snout is subconical, somewhat longer than the eye, with the jaws equal anteriorly. The width of the interorbital space is much less than the vertical diameter of the eye. A long fringed tentacle at the nostril, that above the orbit being rather shorter. Scales minute. The detached dorsal fin is situated on the nape of the neck, above the operculum; the last dorsal ray is fixed by a membrane to the back of the tail, but is free from the caudal fin. Uniform yellowish (in spirits).

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* Those who consider this variety as a separate species may call it *Cristiceps antinectes.*

New South Wales.

a. Young? New South Wales. Presented by J. B. Bennett, Esq.

	lines.
Total length	22
Height of the body	4
Length of the head	5

4. **Cristiceps roseus.**

B. 6. D. $3\left|\frac{25-26}{4}\right.$. A. $\frac{2}{20-21}$. V. 1/3. P. 12. C. 9. Vert. 14/26.

The height of the body is contained five times in the total length, the length of the head four times and two-fifths. The snout is subconical, equal in length to the eye, with the lower jaw prominent. Teeth on the vomer, none on the palate. The width of the interorbital space is much less than the vertical diameter of the eye. A fringed tentacle at the nostril; that above the orbit well developed, with obtuse fringes. Scales rudimentary. The detached dorsal fin situated on the nape of the neck, above the operculum; it is somewhat higher than the fin behind: the last dorsal ray is fixed by a membrane to the base of the caudal; the anal is quite free from it: the inner ventral ray is not half so long as the middle one. Yellowish (in spirits); head, body, and the first dorsal marbled with rose-colour. The second dorsal, anal, and pectoral fins with rose-coloured cross-bars.

Coasts of Australia and New Guinea.

a. Dried. Freycinet's Harbour. Voyage of the 'Herald.'
b–d. New Guinea and Islands. Presented by Mrs. Stanley.

	lines.
Total length	44
Height of the body	9
Length of the head	10

Another specimen, fifty lines long, uniform, or with the colours faded, differs in having the first dorsal situated above the præopercular margin. Perhaps it belongs to a different species. The lower jaw does not project beyond the upper.

a. Adult. Dredged in from two to four fathoms, on sandy ground. Gages Road, Swan River. Presented by the Earl of Derby.

5. Cristiceps australis.

Cuv. & Val. xi. p. 402. pl. 336.

D. $3 \left| \frac{27–29}{8–5} \right.$. A. $\frac{2}{23–25}$. V. 1/3. Vert. 15/31.

The anterior dorsal commences above the posterior margin of the orbit, and is much higher than the posterior; both are widely separated from each other. A simple tentacle above the orbit, and a pair of bifurcate ones above the snout.

Rivers of Tasmania. Swan River. Bynoe.

a–b. Half-grown. Dredged in from two to four fathoms, on sand. Gages Road, Swan River. Presented by the Earl of Derby.
c. Half-grown. Swan River; the same locality. Presented by the Earl of Derby.
d. Young. Australia.
e. Young. Bynoe.
f, g, h–l. Adult and half-grown.

14. AUCHENOPTERUS.

Body moderately elongate, with the scales small or of moderate size; snout rather short, with the cleft of the mouth of moderate width. A band of small teeth in the jaws; teeth on the vomer. Two separate dorsals, composed of spines only: the anterior short, formed by three spines. Ventrals jugular, composed of three rays. Head with tentacles; gill-opening wide.

Pacific coast of Central America. Mediterranean.

1. Auchenopterus monophthalmus.

D. 3 | 27. A. $\frac{2}{19}$. V. 3. L. lat. 38.

A fimbriated superciliary tentacle; a small one at the nostril and on each side of the nape, both multifid. A black ocellus, edged with white, on the posterior quarter of the dorsal fin.

a–c. Pacific coast of Central America. Collected by Captain Dow; presented by Dr. P. L. Sclater, Secr. Zool. Soc.

Description.—This fish is very similar to *Cristiceps argentatus* in general habit, but may readily be distinguished by the dorsal fin, which is entirely composed of spines. Head and body oblong and compressed; the length of the former is one-fourth of the total, the height of the latter one-sixth. The cleft of the mouth is of moderate width, with the lower jaw slightly prominent, and with the maxillary extending beyond the vertical from the centre of the orbit. The teeth in the outer series are stronger than those in the narrow band behind; vomerine teeth apparently in a single series; palatine teeth none. The orbital tentacle is shorter than the eye, with three or four cilia; the nasal and nuchal tentacles are still shorter. The pectoral is nearly as long as the head, rounded, with the middle rays longest; ventral slender, somewhat shorter than the pectoral, with the outer ray longest. The first dorsal fin commences in the vertical from the præopercular margin; the two anterior spines are a little higher than the second dorsal, and flexible; the membrane behind the third spine extends backwards to the base of the second fin. All the spines of the second fin are stiff and pungent, of nearly equal length, the anterior ones being a little the shorter; the membrane of the last spine terminates immediately before the base of the caudal, leaving that fin quite free. Caudal rounded, one-seventh of the total length. The anal commences below the seventh spine of the posterior dorsal, and terminates before the caudal; it has two spines anteriorly. The scales are of moderate size; the lateral line runs closely along the dorsal profile, is bent downwards behind the pectoral, and proceeds along the middle of the tail to the caudal.

Brownish, irregularly marbled with darker; anterior dorsal blackish; a black ocellus, edged with white, on the nineteenth and twentieth spines of the posterior dorsal.

Total length two inches.

The following species appears to belong to this genus:—

2. Auchenopterus veranyi.

Clinus veranyi, *Filippi e Verany, Mem. della R. Accad. delle Sc. di Torino*, ser. 2. tom. xviii., *sopra alcuni Pesci, etc.*, separate copy, p. 9. fig. 3.

D. 3 | 27. A. 22.

The height of the body is nearly equal to the length of the head, and is contained four times and a half in the total. A tentacle above the orbit. The three anterior dorsal spines form an entirely separate fin; the remainder and the anal are united with the caudal. Scales very small. (*F. & V.*)

Gulf of Cagliari.

15. TRIPTERYGIUM.

Tripterygion, *Risso, Eur. Mérid.* iii. p. 241.

Body not very elongate, covered with rather small scales or with scales of moderate size. Snout of moderate extent. Jaws with a band of villiform teeth; teeth on the palate. Three dorsal fins, the two anterior of which are spinous, the middle one being the longest. Ventrals jugular, with two soft rays. Branchiostegals six. Pseudobranchiæ present.

Mediterranean. Fresh waters and coasts of New Zealand. One species from Biliton.

1. Tripterygium nasus.

Blennius tripteronotus, *Risso, Ichthyol. Nice*, p. 135. pl. 5. fig. 14 (bad).
Tripterygion nasus, *Risso, Eur. Mérid.* iii. p. 241; *Cuv. & Val.* xi. p. 409. pl. 338; *Lowe, Trans. Zool. Soc.* iii. p. 9; *Guichen. Explor. Algér. Poiss.* p. 75.

Tripterygium melanocephalum, *Cocco, Act. Acad. Genn.* 1829, fasc. 1. pl. 4.

B. 5 or 6? D. 3 | 17 | 12. A. 24. V. 2. L. lat. 40.

The height of the body is contained six times in the total length, the length of the head four times and a half. The width of the interorbital space is one-half the diameter of the eye. Teeth on the vomer. The first dorsal commences in the vertical from the base of the ventral fins, and is not elevated; the anterior spines of the second sometimes elongate and filiform. Body with brownish vertical bands; head and the basal half of the ventrals black, sometimes only spotted with black.

Mediterranean. Sea of Madeira.

a, b. Adult and half-grown. Mediterranean. Presented by the Rev. W. Hannah.

2. Tripterygium melanurum.

Guichen. Explor. Algér. Poiss. p. 75. pl. 4. fig. 4.

D. 3 | 17 | 12. A. 24. V. 2.

Reddish, marbled with brown. The first dorsal black, the two others with oblique red lines; tail with a large black, yellow-edged spot. (*Guichen.*)

Coast of Algiers.

3. Tripterygium varium.

Blennius varius, (*Forster*) *Bl. Schn.* p. 178; *Forst. Descript. Anim. cur. Lichtenst.* p. 127.

Tripterygium varium, *Cuv. & Val.* xi. p. 414.

B. 6. D. 5 | 24 | 14. A. 26. V. 2.

Transverse streaks across the opercles and breast; body dotted with brown; the first dorsal with a black spot; the second with a series of white spots along the base. (*Forst.*)

Coast of the Southern Island of New Zealand.

4. Tripterygium nigripinne.

Tripterygion nigripinne, *Cuv. & Val.* xi. p. 413. pl. 339.

—— capito, *Jenyns, Zool. Beagle, Fishes,* p. 94. pl. 19. fig. 1.

D. 5–6 | 18–19 | 13–14. A. 26. V. 2.

A short denticulated tentacle above each orbit; teeth on the vomer and the palatine bones. Brownish, marbled with darker; the first dorsal black, the others greyish.

Bay of Islands (New Zealand).

a. A great number of specimens from New Zealand.

b. Adult. New Zealand. Presented by Dr. A. Sinclair.—This specimen differs from the others in having the dorsal fin lower, and formed by five spines. It agrees perfectly, however, in all other points with the other specimens, and is certainly only an individual variety.

5. Tripterygium forsteri.

Blennius tripinnis, (*Forster*) *Bl. Schn.* p. 174; *Forst. Descript. Anim. cur. Lichtenst.* p. 125.
Tripterygium forsteri, *Cuv. & Val.* xi. p. 415.

B. 6. D. 3 | 16 | 15. A. 24. V. 2.

A fringed tentacle above the orbit and at the nostril. Brown, spotted with reddish; a semicircular blackish-blue, golden-edged spot at the base of the pectoral. (*Forster.*)

New Zealand?

6. Tripterygium medium.

D. 4 (5) | 15–16 | 12–13. A. 20–21. V. 2.

Similar in form to *T. nigripinne.* Snout short, somewhat longer than the eye, with the upper profile very oblique; the upper maxillary extends a little beyond the vertical from the anterior margin of the orbit. The front teeth are somewhat enlarged; teeth on the vomer and the palatine bones. The interorbital space is flat, its width being less than that of the orbit; orbital tentacles none. The first dorsal is lower than the second, and the second lower than the third. Scales rather small; the lateral line does not extend on to the tail. Specimens in spirits brownish; dorsal, caudal, and pectoral fins dotted with brown.

New Zealand.

a–g. Adult. New Zealand. From the Haslar Collection.

Two other specimens scarcely differ from those described, but they have twenty-three anal rays. Snout rather short, longer than the eye, with the upper profile oblique; the upper maxillary does not extend to the vertical from the centre of the eye. The front teeth are somewhat enlarged; teeth on the vomer and the palatine bones. The interorbital space is flat, its width being a little less than that of the orbit; orbital tentacle none, a small one at the nostril. The first dorsal is continuous with, and lower than, the second, and the second is lower than the third. Scales rather small; the lateral line ceases on the anterior portion of the tail. Brownish, marbled with blackish; the upper portions of the dorsal fins blackish; caudal variegated with blackish.

New Zealand.

h. Fine specimen. New Zealand. Presented by Captain Stokes.
i. Adult: not good state. From the Haslar Collection.

7. Tripterygium fenestratum.

Blennius fenestratus, (*Forster*) *Bl. Schn.* p. 173; *Forst. Descript. Anim. cur. Lichtenst.* p. 124.
Tripterygium fenestratum, *Cuv. & Val.* xi. p. 416.

B. 6. D. 4 | 10 | 13. A. 24. V. 2.

A simple truncated tentacle above the orbit; another small one, fringed, at the nostril. Brown: fins with transparent spots. (*Forst.*)

Mouths of the rivers in New Zealand.

8. Tripterygium trigloides.

Bleeker, Biliton, iv. p. 234.

B. 6. D. 3 | 13 | 10. A. 10. V. 2. L. lat. 50–55.

The upper jaw projects beyond the lower. Greenish, marbled with brown and dotted with whitish. (*Bl.*)

Sea of Western Biliton.

16. DACTYLOSCOPUS.

Dactyloscopus, *Gill, Proc. Acad. Nat. Sc. Philad.* 1859, p. 132.

Body elongate, covered with large scales; lateral line straight, along the middle; head broad, depressed, with the eyes directed upwards and with the cleft of the mouth subvertical; operculum fringed. Small teeth in the jaws, palate smooth. One dorsal, formed by spines only; caudal separated; ventrals jugular, with three rays. Branchiostegals six; pseudobranchiæ none; gill-openings wide.

Caribbean Sea.

This genus has been referred by Gill to the *Uranoscopina*, from which, however, it differs in several cardinal characters. The structure of the dorsal and ventral fins is that of a Blennioid. The absence of *pseudobranchiæ* is very peculiar; but in this respect it differs equally from the *Uranoscopina* and *Blenniidæ*.

1. Dactyloscopus tridigitatus.

Gill, l. c.

D. 37. A. 30. V. 3. L. lat. 44. L. transv. 9. Vert. 13/32.

A small tentacle at the nostril. The anterior dorsal spines small, flexible, nearly free; the posterior stiff. Reddish-white, marbled with brownish.

Caribbean Sea (Barbadoes).

a–d. Fine specimens. Caribbean Sea.

17. DICTYOSOMA.

Dictyosoma, *Schleg. Faun. Japon. Poiss.* p. 139.

Body elongate, covered with very small scales, and with a net of lateral lines; snout of moderate extent; small teeth in the jaws, none on the palate. Dorsal fin long, with a few posterior soft rays; anal with two spines; caudal distinct; ventrals none. Branchiostegals six.

Japanese Sea.

1. Dictyosoma temminckii.

Dictyosoma, *Schleg. l. c.* pl. 73. fig. 3.
—— temminckii, *Bleek. Verhand. Batav. Genootsch.* xxv., *Japan,* p. 42.

B. 6. D. $\frac{58}{9}$. A. $\frac{2}{43}$.

Brownish.

Bay of Simabara.

18. GUNELLICHTHYS.

Gunellichthys, *Bleek. Act. Soc. Sc. Indo-Nederl.* iii., *Celebes,* ix. p. 9.

Body elongate, covered with rudimentary scales; snout rather obtuse; lower jaw with a short skinny appendage. Jaws with teeth of unequal size; palate smooth. Dorsal fin long, formed by flexible spines; caudal distinct. Ventrals two-rayed, scarcely before the pectorals. Gill-openings not continued on to the throat; branchiostegals six.

Coast of Celebes.

1. Gunellichthys pleurotænia.

Bleeker, l. c. p. 10.

B. 6. D. 59. A. 34. V. 2.

The height of the body is about one-fifteenth of the total length. Rose-coloured, with a brown, white-edged streak from the snout, through the eye, to the middle of the caudal fin. (*Bl.*)

Sea of Manado.

19. STICHÆUS*.

Gunellus, sp., *Cuv. & Val.*
Lumpenus et Stichæus, *Kröyer, Naturhist. Tidskr.* i. 1837, p. 377.
Ctenodon et Lumpenus, *Nilss. Skand. Faun.* iv. p. 190.

Body elongate, covered with very small scales; lateral line more or less distinct; sometimes several lateral lines. Snout short, or of moderate extent; very small teeth in the jaws and, generally, on the palate. Dorsal fin long, formed by spines only. Ventrals jugular, with two or three rays; caudal distinct. Gill-openings rather wide, the gill-membranes being only slightly united at the throat; pseudobranchiæ present; branchiostegals six; air-bladder and pyloric appendages absent.

Seas near the Arctic Circle, southwards to the coasts of Japan and Scandinavia.

1. Stichæus lumpenus.

Blennius lumpenus, *Fabr. Faun. Grönl.* p. 151, and *Schrift. Naturhist. Gesellsch. Copenh.* ii. p. 87, cop. by *Richards. Faun. Bor. Amer. Fishes,* p. 90.
Clinus lumpenus, *Reinh. Danske Vidensk. Selsk. Naturv. og Mathem. Afhandl.* vii. 1838, p. 194.
Gunellus fabricii, *Cuv. & Val.* xi. p. 431.
Lumpenus fabricii, *Kröyer, Naturhist. Tidskr.* i. p. 377; *Gaimard, Voy. en Scand. et Lapon. Zool. Poiss.* pl. 14. fig. 1.

D. 63. A. 41. V. 3.

The height of the body is one-fourteenth of the total length. The upper jaw scarcely longer than the lower; ventrals very slender, composed of three rays; caudal distinct. Palatine teeth. Light brown, clouded with darker.

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* 1. Pholis subbifurcatus, *Storer, Rep. Massach.* p. 63, and *Dekay, New York Fauna, Fishes,* p. 150, appears to belong to this genus.—Massachusetts Bay.

Coast of Greenland.

2. Stichæus medius.

Clinus medius, *Reinh. Danske Vidensk. Selsk. Naturv. og Mathem. Afhandl.* vii. 1838, pp. 114, 121, 194.
Lumpenus medius, *Kröyer, l. c.*

D. 60. A. 43. V. 1/2.

The height of the body is one-tenth or one-eleventh of the total length. The upper jaw slightly overlapping the lower. Ventrals slender, one-third the length of the head; the lower pectoral rays shorter than the middle ones; dorsal and anal fins slightly continuous with the caudal. Vomerine and palatine teeth none. Brown.

Greenland.

The diagnosis is taken from a specimen in the Leyden Museum.

3. Stichæus maculatus.

Clinus maculatus, *Fries in Kongl. Vet. Akad. Handl.* 1837, p. 51, and *Fries och Ekstr. Skand. Fisk.* p. 108. pl. 25. fig. 2.
Ctenodon maculatus, *Nilss. Skand. Faun.* iv. p. 190.

D. 59–61. A. 36. V. 1/2. Cæc. pylor. 3.

The height of the body is one-tenth or one-eleventh of the total length. The upper jaw slightly overlapping the lower. Ventrals slender, one-half as long as the head; the lower pectoral rays longer than the middle ones; caudal free from dorsal and anal. Palatine and vomerine teeth. Light brown, clouded with darker.

Coast of Bohuslæns (Sweden).

The diagnosis is taken from a specimen in the Senckenberg Museum.

4. Stichæus islandicus.

Tang-brosme 4, *Ström, Söndm.* i. p. 315.
Blennius capite lævi, *Mohr, Isl. Naturh.* p. 85. tab. 4.
—— islandicus, *Walb. Art. Renov.* iii. tab. 3. fig. 6.
—— lampetræformis, *Walb. l. c.* p. 184; *Kröy. Naturhist. Tidskr.* i. 1837, p. 32 (Clinus mohrii).
Centronotus islandicus, *Bl. Schn.* p. 157.
—— lumpenus, *Nilss. Prodr.* p. 104.
Blennius gracilis, *Stuvitz in Nye Magaz. for Naturv.* i. p. 406. pl. 3.
Gunellus islandicus, *Cuv. & Val.* xi. p. 433.
Clinus nebulosus, *Fries, Vet. Akad. Handl.* 1837, p. 55.
Lumpenus gracilis, *Reinh. Danske Vidensk. Selsk. Naturv. og Mathem. Afhandl.* vii. 1838, p. 194.
—— nebulosus, *Nilss. Skand. Faun. Fisk.* iv. p. 195.

D. 69–72. A. 48–50. V. 1/3.

Neither vomerine nor palatine teeth. The height of the body is one-fourteenth or one-sixteenth of the total length. Ventral rays indistinct. Marbled with brown.

Coasts of Scandinavia and Iceland.

Faber (Fische Islands, p. 79) considers this species as identical with *Blennius lumpenus* of Fabricius, but he does not appear to have known it from autopsy.

5. Stichæus aculeatus.

Clinus aculeatus, *Reinh. Danske Vidensk. Selsk. Naturv. og Mathem. Afhandl.* vii. 1838, pp. 114, 122, 194.

* Lumpenus aculeatus, *Kröyer, Naturhist. Tidskr.* i. p. 377; *Gaimard, Voy. en Scand. et Lapon. Zool. Poiss.* pl. 14. fig. 2.

B. 6. D. 72. A. 46. V. 1/2.

The upper jaw overlapping the lower; vomerine and palatine teeth. Ventrals slender, one-half the length of the head; pectorals as long as, or not much shorter than, the head; caudal free from dorsal and anal, rounded. A series of darker spots along the base of the dorsal fin.

Coast of Greenland.

a, b. Adult. Greenland.

6. Stichæus anguillaris.

Blennius anguillaris, *Pall. Zoogr. Ross.* iii. p. 176.

Gunellus anguillaris, *Cuv. & Val.* xi. p. 434.

Leptogunellus anguillaris, *Ayres in Proc. Calif. Acad. Nat. Sc.* 1855, p. 26.

Lumpenus anguillaris, *Girard in U.S. Pacif. R. R. Exp. Fishes,* p. 123 (pl. 25 *b.* figs. 1–3).

B. 6. D. 68. A. $\frac{2}{46}$. V. 1/3. Cæc. pylor. 6. Vert. 28/51.

Vomer smooth; palatine teeth. The upper jaw overlapping the lower; snout somewhat longer than the eye. The length of the pectoral fin is one-tenth of the total; the ventral one-half the length of the pectoral; caudal free from dorsal and anal. Body with interrupted blackish longitudinal streaks.

Coast of Kamtschatka; Aleutian Islands; Western coasts of North America.

Pseudobranchiæ. The liver is elongate, bilobed, the left lobe being the longest. The stomach is strongly curved, and its pyloric portion provided with six appendages of moderate length, namely, four on one, and two on the other side. The intestinal tract makes a single short curve, and is not quite one-half the length of the fish.

a–c. Adult and half-grown. New Orcas Islands, Gulf of Georgia. Presented by the Lords of the Admiralty.

d. Adult: skeleton. New Orcas Islands. Presented by the Lords of the Admiralty.

Skeleton.—The skeleton differs in several points from that of the typical Blennioids: the bones are less ossified, and rather thin; the skull is slightly compressed, and somewhat elongate; crown of the head smooth, flat, without crest; interorbital space very narrow; the infraorbital ring is either absent or lost in our skeleton; the bottom of the tympanic groove is osseous, but thin. Posterior limb of the præoperculum very short; operculum elongate, triangular. Ulna and radius broad, much larger than the carpal bones. There are twenty-eight abdominal and fifty-one caudal vertebræ, the latter portion being twice as long as the abdominal; the vertebræ are slightly compressed, rather longer than high; processes and ribs very feeble.

7. **Stichæus punctatus.**

Blennius punctatus, *Fabr. Faun. Grönl.* p. 153, and *Naturhist. Selsk. Skrift.* ii. part 2. pl. 10. fig. 3.
Clinus punctatus, *Richards. Faun. Bor. Amer. Fishes*, p. 88.
Gunellus punctatus, *Cuv. & Val.* xi. p. 428.
Stichæus punctatus, *Kröyer, Naturhist. Tidskr.* i. p. 377; *Gaimard, Voy. en Scand. et Lapon. Zool. Poiss.* pl. 20. fig. 2.

B. 6. D. 49. A. $\frac{1}{35}$. V. 3.

The height of the body is contained eight times in the total length, the length of the head five times and one-fourth. Snout subconical, with the cleft of the mouth horizontal; the width of the interorbital space is one-half the diameter of the eye, which is very projecting. Vomerine and palatine teeth. The ventral fin is half as long as the pectoral, which nearly equals the length of the head. Dorsal spines of moderate length, stiff; caudal distinct. Dorsal with a series of five round black, posteriorly white-edged spots; the lower part of the head with five brown cross-bands; a brown streak from the snout, running through the eye.

Coasts of Greenland and Newfoundland.

a. Fine specimen. Greenland.

8. **Stichæus unimaculatus.**

Clinus unimaculatus, *Reinh. Danske Vidensk. Selsk. Naturv. og Mathem. Afhandl.* 1835, pp. 9–11.
Chirus præcisus, *Kröyer, Naturhist. Tidskr.* 1837, p. 25.
Stichæus unimaculatus, *Reinh. l. c.* 1837, p. 109; *Kröyer, l. c.* pp. 375, 377; *Gaimard, Voy. en Scand. et Lapon. Zool. Poiss.* pl. 20. fig. 1.

D. 49. A. 34. V. 3.

The height of the body is contained six times and a half in the total length, the length of the head four times and two-thirds. Snout subconical, with the cleft of the mouth slightly oblique; vomerine and palatine teeth. Three lateral lines on each side. The ventral is half as long as the pectoral, which is much shorter than the head. The dorsal fin terminates just at the root of the caudal. An ovate black, white-edged spot between the sixth and tenth dorsal spines.

Coast of Greenland.

a. Fine specimen. Greenland.

9. Stichæus hexagrammus.

Schlegel, Faun. Japon. Poiss. p. 136. pl. 73. fig. 1.

B. 6. D. 40. A. 29. V. 3.

The height of the body is contained six times and a half in the total length, the length of the head four times and a half. Snout conical, with the cleft of the mouth nearly horizontal. Three lateral lines on each side. The ventrals are shorter than the pectorals. Dorsal continuous with the caudal. Brownish: two oblique streaks behind the eye; pectoral dotted with brown. (*Schleg.*)

Bay of Simabara (Japan).

20. BLENNIOPS.

Blennius, sp., *auct.*
Blenniops, *Nilss. Skand. Faun.* iv. p. 184.

Body moderately elongate, covered with very small scales; lateral line none. Snout short; small teeth in the jaws, none on the palate. Dorsal fin long, formed by spines only. Ventrals very distinct, composed of one spine and several rays, distinctly jugular. Caudal distinct. Gill-openings of moderate width, with the gill-membranes connected with each other; pseudobranchiæ present; branchiostegals six; air-bladder and pyloric appendages none.

British and Scandinavian coasts.

1. Blenniops ascanii.

Blennius, sp., *Ström, Söndm.* i. p. 322 (not syn.).
Brosme toupée, *Ascan. Ic.* tab. 19.
Blennius galerita, part., *L. Syst.* i. p. 441 *.
—— galerita, *Penn. Brit. Zool.* iii. p. 276. pl. 35; *Flem. Brit. Anim.* p. 207; *Nilss. Prodr. Ichth. Scand.* p. 102; *Turton, Brit. Faun.* p. 92; (not *L.*).
—— ascanii, *Walbaum, Art. Renov.* iii. p. 173; *Reinhardt, Maanedsk. f. Liter.* 1833, p. 259; *Kröyer, Naturhist. Tidskr.* i. 1837, p. 372.
Centronotus brosme, *Bl. Schn.* p. 167.
Blennius coquillad, *Lacép.* ii. p. 477.
—— pennantii, *Jenyns, Catal. Brit. Vert. Anim.* p. 24.
—— palmicornis, *Yarrell, Brit. Fishes,* 1st edit. i. p. 233; *Jenyns, Man.* p. 380; (not *Cuv.*).
—— yarrellii, *Cuv. & Val.* xi. p. 218; *Yarrell, Brit. Fishes,* 2nd edit. i. p. 263, and 3rd edit. ii. p. 371†.
Gunellus stroemii, *Cuv. & Val.* xi. p. 444.
Blenniops galerita, *Nilss. Skand. Faun.* iv. p. 185.

B. 6. D. 50–51. A. 36–39. V. 1/3.

The height of the body is nearly equal to the length of the head, and one-seventh of the total. Snout short, with the cleft of the mouth very oblique. A short tentacle at the nostril; two pairs of fringed tentacles above the orbits, the posterior of which is about three or four times the length of the anterior, and as long as the head is high. Neck with many very small skinny flaps. Ventral fins small; the two anterior dorsal spines sometimes elongate, and provided with skinny appendages at the top. Reddish-brown, with several cross-bands on the back.

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* See *Blennius galerita*, p. 222.

† Yarrell, although in possession of very fine specimens, omitted to mention the scales covering the entire body of the fish, and placed the species in a scaleless genus; in consequence of which, Valenciennes created the nominal species of *B. yarrellii.*

British and Scandinavian coasts.

a. Adult. Polperro. Presented by J. Couch, Esq.
b–e, f, g, h. Adult.

21. CENTRONOTUS*.

Centronotus, *Bl. Schn.* p. 165.
Gunellus, sp., *Cuv. Règne Anim.*; *Cuv. & Val.* xi. p. 418.
Gunellus, *Kröyer, Naturhist. Tidskr.* 1837, i. p. 376.

Body elongate, covered with very small scales; lateral line none; snout short; very small teeth in the jaws, and sometimes on the palate. Dorsal fin long, formed by spines only. Ventrals none, or, if present, rudimentary and jugular; caudal distinct (except in *C. roseus*). Gill-openings of moderate width; gill-membranes connected with each other; pseudobranchiæ present; branchiostegals five; air-bladder and pyloric appendages absent.

Northern Seas, southwards to the coasts of France, New York, California, and Japan.

1. Centronotus gunellus.

Gunellus cornubiensium or Butter-fish, *Willughby*, p. 115. cap. ix. tab. G. 8. fig. 3; *Ray*, p. 144; *Petiver, Gazoph.* tab. 51. fig. 4.
Blennius, sp., *Artedi, Genera*, p. 27. n. 5.
Tang-Brosme 3, *Ström, Söndm.* i. p. 315, and *Norsk. Vid. Selsk. Skr. Nya Saml.* i. p. 148.
Blennius gunellus, *L. Syst.* i. p. 443, and *Faun. Suec.* p. 114. no. 318; *Bl. Fische Deutschl.* ii. p. 186. taf. 71. fig. 1; *Lacép.* ii. p. 503; *Donov. Brit. Fishes*, ii. pl. 27; *Turton, Brit. Fauna*, p. 93; *Jenyns, Man.* p. 383; *Müll. Prodr. Zool. Dan.* p. 43; *Faber, Fische Islands*, p. 76; *Richards. Faun. Bor. Amer. Fishes*, p. 91; *Retz. Faun. Suec.* p. 324; (not *Fabr.*).

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* 1. Ophidium mucronatum, *Mitch. in Lit. & Phil. Trans. New York*, i. p. 361. pl. 1. fig. 1. — Gunellus mucronatus, *Cuv. & Val.* xi. p. 427; *Dekay, New York Fauna, Fishes*, p. 153. pl. 12. fig. 36.—New York.—This fish appears to be extremely similar to *C. gunellus*.
2. Blennius tænia, *Pall. Zoogr. Rosso-Asiat.* iii. p. 178.—Gunellus tænia, *Cuv. & Val.* xi. p. 439.—Kuriles.
3. *Pall. Zoogr. Rosso-Asiat.* iii. p. 178.—Gunellus ruberrimus, *Cuv. & Val.* xi. p. 440.—Kuriles.
4. Blennius polyactocephalus, *Pall. Zoogr. Rosso-Asiat.* p. 179—Gunellus polyactocephalus, *Cuv. & Val.* xi. p. 448.—Kamtschatka.
5. Gunellus crassispina, *Schleg. Faun. Japon. Poiss.* p. 139.—Japan.
6. —— macrocephalus, *Girard, Bost. Journ.* 1850, vi. p. 263.—Massachusetts.
7. Clinus affinis, *Reinh. Danske Vidensk. Selsk. Naturvid. og Mathem. Afhandl.* 1838, vii. pp. 114, 123.—Gunellus affinis, *Kröyer, Naturhist. Tidskr.* i. 1837, p. 376.—Greenland.

Pholis, sp., *Gronov. Zoophyl.* n. 267, and *Mus. Ichthyol.* i. n. 77. p. 33.
Blennius europæus, *Olav. Reise*, i. p. 81, and *Beskr. over Skagen*, p. 165. tab. 3. fig. 1.
—— maculis X., *Olafs. Reise*, § 680. tab. 10. figs. 12, 13.
—— murænoides, *Sujef in Act. Petropol.* 1779, ii. p. 195. tab. 6. fig. 1; *L. Gm.* p. 1184 (young).
Centronotus gunellus, *Bl. Schn.* p. 167; *Fries och Ekstr. Skand. Fisk.* p. 105. tab. 25. fig. 1.
—— murænoides, *Bl. Schn.* p. 166.
Spotted Blenny, *Penn. Brit. Zool.* iii. p. 183. pl. 35, and (edit. 1812) iii. p. 282. pl. 39.
? Purple Blenny, *Low, Faun. Orcad.* p. 203; *Parn. Wern. Mem.* vii. p. 235 (variety?).
Gunellus vulgaris, *Flem. Brit. Anim.* p. 207; *Cuv. & Val.* xi. p. 419; *Nilss. Skand. Faun.* iv. p. 200.
Murænoides guttata, *Yarr. Brit. Fishes*, i. p. 269, and 3rd edit. ii. p. 376; *Parn. Fishes Frith of Forth*, p. 75.
Pholis gunellus, *Gronov. Syst. ed. Gray*, p. 99.
Gunellus ingens, *Storer, Boston Journ. Nat. Hist.* 1850, vi. p. 261. pl. 8. fig. 1.

B. 5. D. 76–81. A. $\frac{2}{39-44}$. V. 1/1. Vert. 84–86.

The height of the body is contained nine times or nine times and a half in the total length, the length of the head eight times and a half. Snout short, with the cleft of the mouth very oblique; the width of the interorbital space is less than the diameter of the eye. Pectoral not quite half so long as the head; ventral very small, composed of one spine and one ray; dorsal spines short, stiff; caudal distinct. A series of from ten to thirteen round black, white-edged spots along the base of the dorsal fin. Head and caudal sometimes minutely dotted with black.

Northern coasts of Europe, southwards to the coasts of France. Coasts of Iceland and Greenland.

a. Fine specimen. Frith of Forth.
b. Adult. Frith of Forth.
c. Adult: stuffed. Frith of Forth.
d. Half-grown. Berwick-on-Tweed. Presented by Dr. G. Johnston.
e. Adult. South Wales. Presented by J. Stokes, Esq.
f–g. Adult. South Devon. Museum Leach.
h. Half-grown. Falmouth. Purchased.
i–k. Adult: skin and stuffed. Plymouth.
l–p. Adult: skins. English coast. From Mr. Yarrell's Collection.
q, *r–t*, *u–v*. Adult. British coast. From the Haslar Collection.
w, *x*, *y*, *z–β*. Adult, half-grown, and young.
γ. Adult: skin. From Gronow's Collection.
δ. Adult: skeleton. Presented by Dr. G. Johnston.
ε. Half-grown: skeleton. Purchased.
ζ. Intestines of specimen *δ*.

It would appear from Storer's description that the specimens found on the American side of the North Atlantic have the body deeper than those from Europe, its depth being about one-seventh of the total length. The figure, however, given by the same author represents a fish perfectly identical with the European, even with regard to the depth of the body, which, in the specimen figured, is nearly one-ninth of the total.

Skeleton.—The skull is compressed and rather short; its crown rounded on the sides and perfectly smooth; the interorbital space very narrow; infraorbital ring rudimentary. The vertebræ are compressed, short, higher than long; the lower processes of all the abdominal vertebræ are united and form a hæmal canal.

2. **Centronotus fasciatus.**

Blennius gunellus, *Fabric. Faun. Grönl.* p. 149; (not *L.*).
Centronotus fasciatus, *Bl. Schn.* p. 165. pl. 37. fig. 1.
Gunellus fasciatus, *Cuv. & Val.* xi. p. 441; *Reinh. Danske Vidensk. Selsk. Naturvid. og Mathem. Afh.* vii. 1838, p. 122.
—— groenlandicus, *Reinh. l. c.*; *Cuv. & Val.* xi. p. 442. pl. 340; *Kröyer, Naturhist. Tidskr.* 1837, p. 372.
—— murænoides, (!) *Valenc. in Cuv. Règne Anim. Ill. Poiss.* pl. 78. fig. 2.

B. 5. D. 88–89. A. $\frac{2}{43}$. V. 1/1.

The height of the body is eight times to ten times and a half in the total length, the length of the head ten times and a half. Snout short, with the cleft of the mouth very oblique. The width of the interorbital space is less than the diameter of the eye. The length of the pectoral is equal to, or rather less than, one-half the length of the head; ventral very small, composed of one spine and one ray; dorsal spines very short and stiff; caudal distinct. Greyish- or brownish-grey, marbled with darker, anteriorly with several rather irregular cross-bands, descending to the abdomen; back with a series of ten or twelve subtriangular light-coloured spots along the base of the dorsal, each spot including some brown specks. A yellowish or whitish, brown-edged vertical band behind the eye; a brownish band from below the eye to the throat.

Coasts of Greenland.

a. Fine specimen. Greenland.
b. Adult. From the Haslar Collection.

3. **Centronotus nebulosus.**

Gunellus nebulosus, *Schleg. Faun. Japon. Poiss.* p. 138.
—— ornatus, *Girard, Proc. Acad. Nat. Sc. Philad.* vii. 1854, p. 149, and *U. S. Pacif. R. R. Exped. Fishes*, p. 116. pl. 256. figs. 5, 6.
Centronotus subfrenatus, *Gill, Proc. Acad. Nat. Sc. Philad.* 1859, p. 146.

D. 74–80. A. $\frac{2}{37}$. V. 1/1.

The height of the body equals the length of the head, and is contained about eleven times in the total. Snout short, with the cleft of the mouth oblique. The width of the interorbital space is rather less than the diameter of the eye. The length of the pectoral is nearly one-half of that of the head; ventral very small, composed of one spine and one ray; dorsal spines short and stiff; caudal distinct. Reddish-brown, marbled with darker; a series of more or less distinct dark spots along the base of the dorsal and anal fins; a more or less distinct band between the eyes, and a vertical band beneath the eye.

Sea of Japan. Coast of California. Gulf of Georgia. Vancouver Island.

a. Adult: skin in spirits. Japan.
b–c. Half-grown. New Orcas Islands (Gulf of Georgia). Presented by the Lords of the Admiralty.
d–f. Young. Vancouver Island. Collected by Lieut.-Col. Hawkins.

4. **Centronotus apus.**

Blennius gunellus, *Pall. Zoogr. Rosso-Asiat.* iii. p. 173.
Ophidium ocellatum, *Mém. Acad. Sc. St. Pétersb.* iii. 1811, p. 237. tab. 8. fig. 2.
Gunellus apos, *Cuv. & Val.* xi. p. 426.

D. 80. A. 50.

Similar to *Centronotus gunellus*. Ventral none; caudal distinct. Six black ocellated spots along the dorsal fin.

Coast of Kamtschatka.

5. **Centronotus gunelliformis.**

Asternopteryx gunelliformis, *Rüppell in Mus. Senckenb.*
Gunellus grönlandicus? pinnis ventralibus carens, *Rüpp. Verzeichn. Senckenb. Samml. Fische*, p. 16.

D. 81. A. $\frac{2}{41}$.

Ventrals none. The height of the body is contained eight times and a half in the total length, the length of the head nine times and a half. Snout short, with the cleft of the mouth oblique. The width of the interorbital space is less than the diameter of the eye. The length of the pectoral is about one-third of that of the head; dorsal spines short and stiff; caudal distinct. Reddish-brown; with ten brown cross-bands, most distinct on the base of the dorsal and anal fins; light blotches along the dorsal fin, each between two of the brown cross-bands, and each with a brown spot in the centre. A light, brown-edged vertical band below the eye.

Greenland?

The typical specimen is in the Senckenberg Museum.

6. **Centronotus dolichogaster.**

Blennius dolichogaster, *Pall. Zoogr. Rosso-Asiat.* iii. p. 175.
Gunellus dolichogaster, *Cuv. & Val.* xi. p. 436.

D. 93. A. $\frac{2}{50}$.

Snout very short, with the cleft of the mouth oblique; a pair of small bony warts at the place of the ventrals; caudal distinct, but united with the dorsal and anal fins. Brownish-olive, marbled with yellowish.

Coast of Kamtschatka. Aleutian Islands.

Typical specimen in the Berlin Museum.

7. Centronotus alectrolophus.

Blennius alectrolophus, *Pall. Zoogr. Rosso-Asiat.* p. 174.
Gunellus alectrolophus, *Cuv. & Val.* xi. p. 447.

D. 63. A. 44.

Ventral fins none. Crown of the head with a longitudinal crest; jaws equal in length. Caudal distinct; pectoral fins very small. Brownish: dorsal fin with oblique streaks; anal and caudal with waving lines.

Island of Talck (Gulf of Penshin).

8. Centronotus crista galli.

D. 54. A. 37.

Ventral fins none. Crown of the head with a longitudinal crest; jaws equal in length. Caudal not continuous with the other vertical fins; pectorals rather small. Brownish-olive, marbled with darker; sometimes a series of whitish spots along the base of the dorsal fin; cheek with an oblique brownish, darker-edged band.

Coast of Vancouver Island. Gulf of Georgia.

a, b. Vancouver Island. From Lieut.-Colonel Hawkins's Collection.
c, d. Fraser's River. Voyage of H.M.S. Plumper.

Description.—The body is elongate, compressed, its greatest depth being one-eighth of the total length. The head is higher than broad, and its length is contained six times and a half in the total length. The snout is of moderate extent, with the jaws equal anteriorly; the cleft of the mouth is oblique, the maxillary reaching to behind the middle of the eye; the diameter of the eye is one-seventh of the length of the head, and shorter than the snout; nostril with a very small tentacle; a membranaceous crest extends from the end of the snout to the nape of the neck. Series of very distinct pores run round the eye, along the edge of the præoperculum, and along the upper margin of the operculum. The dorsal and anal fins are nearly half as high as the body, and terminate immediately at the root of the caudal fin; caudal rounded, rather small; pectoral half as long as the head.

The scales are very small, scarcely visible; lateral line none.

	lines.
Total length	45
Height of the body	5½
Length of the head	7
Diameter of the eye	1

9. (Centronotus) roseus.

Blennius roseus, *Pall. Zoogr. Rosso-Asiat.* iii. p. 177.
Gunellus roseus, *Cuv. & Val.* xi. p. 438.

D. 100. A. 90. V. 1. Vert. 96.

Body tapering posteriorly, the caudal being confounded with the dorsal and anal fins. Ventrals very small. Snout short, with the lower jaw longest. Palatine teeth. Purple rose-coloured. (*Pall.*)

Kuriles.

22. APODICHTHYS.

Apodichthys, *Girard in Proc. Acad. Nat. Sc. Philad.* 1854, p. 150.

Body elongate, covered with very small scales; lateral line none. Snout short, with the cleft of the mouth oblique. Small teeth in the jaws and on the vomer. Dorsal fin long, formed by spines only, and, like the anal, continuous with the caudal; a very large, excavated, pen-like spine in front of the anal fin, hidden in a pouch; ventrals none. Gill-membranes united under the throat; pseudobranchiæ small; air-bladder none; branchiostegals four; pyloric appendages absent.

West coasts of North America.

1. Apodichthys flavidus.

Apodichthys flavidus, *Girard in Proc. Acad. Nat. Sc. Philad.* 1854, p. 150, and *in U. S. Pacif. R. R. Exped. Fishes*, p. 117.
—— virescens, *Ayres in Proc. Calif. Acad. Nat. Sc.* 1855, p. 55, and *Girard, l. c.* p. 118.

B. 4. D. 86–90. A. 1 | 37–43.

The upper maxillary extends to, or nearly to, the vertical from the posterior margin of the orbit. Yellowish or greenish-olive, sometimes indistinctly marbled with darker, and with a series of whitish spots along the middle of the side; a series of black spots along the base of the dorsal and anal fins; a black streak from the occiput through the eye to the angle of the mouth.

West coasts of North America.

a. Fine female specimen. Gulf of Georgia. Presented by the Lords of the Admiralty.

The intestinal tract is wide and spiral; there are no pyloric appendages; liver and spleen large. The ovarium is situated on the left side, simple, and, in the present state of development, is a large sac with a glandular internal surface; its external opening is situated at the base of a small papilla, immediately behind the vent; a furrow leads from the opening to the groove of the spine before the anal fin, which is evidently connected in some way with the generative organs. The urinary bladder is situated on the right side, and has externally the appearance of a cæcum; its aperture is at the tip of the papilla.

23. XIPHIDION.

Xiphidion, *Girard in U. S. Pacif. R. R. Exped. Fishes,* p. 119.

Body very elongate, naked, or covered with rudimentary scales, with several lateral lines, each emitting lateral branches. Snout short; small teeth in the jaws, with canines; palate smooth. One dorsal, formed by spines only; caudal distinct; ventrals none. Six branchiostegals; gill-opening of moderate width, with the gill-membranes united below the throat; pseudobranchiæ present.

Coast of California.

1. Xiphidion mucosum.

Girard, l. c.

D. 65. A. 48.

The maxillary reaches to the vertical from the posterior margin of the orbit. Three lateral lines extend from the head to the base of the caudal; they are equidistant, the upper and the lower being nearer to the dorsal and ventral outlines than to the middle one; the fourth duct runs from the base of the pectoral to the vent, and is connected with its fellow by a common branch extending from below the pectorals towards the throat. Olive, clouded with blackish-brown; two streaks on the cheek.

Coast of California.

a–c. Adult and half-grown. Monterey.—Scales rudimentary, but conspicuous. Girard was uncertain about the presence of scales, having had specimens in an imperfect state of preservation.

24. CRYPTACANTHODES.

Cryptacanthodes, *Storer, Report Fish. Massach.* p. 28.

Body very elongate, naked, with a single lateral line. Head oblong, subquadrangular, with the muciferous channels well developed. Eye rather small. Conical teeth in the jaws, on the vomer and on the palatine bones. One dorsal, formed by spines only; caudal distinct, but contiguous with dorsal and anal; ventrals none. Six branchiostegals; gill-opening of moderate width, with the gill-membranes joined to the isthmus; four gills, pseudobranchiæ.

Coast of Massachusetts.

1. Cryptacanthodes maculatus.

Storer, l. c.; Dekay, New York Fauna, Fishes, p. 63. pl. 18. fig. 50.

D. 75–77. A. 47–50.

Teeth in the jaws cardiform; those on the vomer and the palatine bones rather strong, in a single series. Reddish-brown, spotted with darker.

Coast of Massachusetts.

a, b. Adult. Boston. Presented by B. Winstone, Esq.

25. PATÆCUS.

Richards. Ann. & Mag. Nat. Hist. 1844, xiv. p. 280, and *Ichthyol. Voy. Ereb. & Terr.* p. 20.

Body oblong, anteriorly elevated; the upper profile of the short snout parabolic; minute teeth in the jaws and on the vomer, palatine bones smooth. Dorsal fin long, anteriorly with some of the spines strong, posteriorly continuous with the caudal; ventrals none. Gill-openings wide; pseudobranchiæ none; branchiostegals six. No cleft behind the fourth gill.

Coasts of Australia.

1. Patæcus fronto.

Richards. Ann. & Mag. Nat. Hist. 1844, xiv. p. 280, and *Ichthyol. Voy. Ereb. & Terr.* p. 20. pl. 13.

B. 6. D. 30. A. 16. P. 8. Vert. 17?/18.

The pectoral fin is considerably longer than the head. Uniform brown.

West Australia.

a. Adult: stuffed. West Australia. Presented by Captain Sir G. Grey.—Type of the species.

2. Patæcus maculatus.

D. 31. A. 12. P. 8.

The pectoral fin is shorter than the head. Olive, black-spotted.

North Australia.

a. Fine specimen. Freemantle. Purchased of Dr. Bowerbank.

Description of the specimen.—This species agrees with *P. fronto* in the general habit; its body is compressed, highest above the operculum, tapering posteriorly; the upper and anterior profile of the head forms a quarter of a circle. The height of the body equals the length of the head, and is one-third of the total length; the eye is very small, situated nearer to the end of the snout than to that of the operculum, and more remote from the lower profile than from the upper. The cleft of the mouth is of moderate width, slightly oblique, and with the jaws nearly equal in length. The teeth are minute, forming bands; there is a small patch of teeth on the vomer. There is a very small tubercle midway between the eye and the end of the snout, but there is no nasal opening. The branchial aperture is obliquely situated; it is very wide, extending on to the symphysis of the lower jaw; no slit behind the fourth gill. The dorsal fin is perfectly continuous, extending from the snout to the middle of the caudal fin; the first spine is very short, the second is the strongest, enveloped in a thick membrane (both are situated before the vertical from the eye); the second and the third are the longest, one-half the height of the body; the following become gradually somewhat shorter; the last twelve rays are rather more flexible than the preceding, and increase again slightly in length. The base of the fin is scarcely to be distinguished from the back, as it is enveloped in the thick integument of the body. The caudal, like the other fins, is composed of simple rays, and very short, its length being contained eight times and a half in the total. The anal commences near the vent, is rather low, and not continuous with the caudal. The pectoral is shorter than the head, inserted immediately above the lower profile, and slightly rounded, the tips of the rays somewhat projecting beyond the membrane.

There is no trace of scales whatever; a lateral line proceeds from the angle of the operculum to the base of the last dorsal ray, running near, and parallel to, the upper profile. A series of flat warts follows a part of its course; other smaller warts are scattered over the lower part of the side and the interoperculum. Olive: head and body dotted and spotted with black; a series of large round spots along the lower half of the dorsal fin, another of small dots along the upper half; the outer half of the caudal and anal fins and the whole of the pectorals black.

	lines.
Total length	38
Height of the body	$13\frac{1}{3}$
Length of the head	13
Diameter of the eye	$0\frac{3}{4}$
Length of the second and third dorsal spines	$6\frac{2}{3}$
——— of the caudal	$4\frac{1}{2}$
——— of the pectoral	10

26. PHOLIDICHTHYS.

Pholidichthys, *Bleek. Boeroe,* p. 406.

Body elongate, tapering, naked; snout obtuse; no membranaceous appendages or filaments. Jaws with teeth of unequal size; palate smooth. Dorsal, anal, and caudal fins united, but distinct, the former formed by flexible spines. Ventrals two-rayed, scarcely before the pectorals. Branchiostegals six.

Sea of Boeroe.

1. Pholidichthys leucotænia.

Bleeker, Boeroe, p. 406.

D. 66. A. 55. V. 2.

The height of the body is contained nine times and a half in the total length, the length of the head five times and four-fifths; head nearly twice as long as high; snout obtuse, shorter than the eye, which is one-fourth of the length of the head. Jaws nearly equal, the upper extending to below the posterior half of the eye. Blackish-violet, with a bluish-white longitudinal band. (*Bleek.*)

Sea of Kajeli (Boeroe).

We have not had an opportunity of seeing specimens of the following genus, which is characterized by Mr. Blyth, as follows:—

27. ANDAMIA.

Andamia, *Blyth in Journ. As. Soc. Beng.* 1859, p. 270.

"Form elongated, with large expanded pectorals and caudal, and a long serrated anal. The ventrals short, even with the pectorals, and consisting each of an outer simple ray and an inner divided ray, which are separated nearly to the base. Head depressed, with rather small eyes, placed vertically and distantly apart; the mouth opening downwards, and furnished with a remarkable labial apparatus: in front it is covered by a thin overflapping upper lip, which is connected laterally by a plicature with a fold or flap of membrane underneath, at a short distance from the mouth behind it: minute marginal teeth in both jaws, which are perceptible to the touch as a slight asperity. Dorsal fin extending the whole length of the back, becoming higher on its posterior half; its spinous and soft rays not easily distinguishable; and the second and third rays are a little elongated in the males, at least of the species described, which also has a small palmated appendage over each eye."

1. Andamia expansa.

Blyth, l. c. p. 271.

"D. 36. A. 26. P. 14. C. 11.

"Colour dark plumbeous above, with slight pale-mottled transverse bands on the sides; the gill-covers studded with minute dusky specks; dorsal fin dusky; the ventral surface and anal fin whitish, with a dark spot on each ray of the latter; membrane of the caudal colourless, with conspicuous black rays, the rays extending beyond the membrane; the caudal having a rounded form, and being almost continuous below with the anal fin. In a young individual the dorsal fin is pale, with the exception of the first two rays, which are black. In adults, the pectorals and posterior half of the dorsal are marked (more or less distinctly) like the caudal black rays, on colourless membrane; ventrals pale. Length $3\frac{5}{8}$ in."

Andaman Islands.

28. GENYPTERUS.

Genypterus, *Philippi in Wiegm. Arch.* 1857, p. 268.

Body elongate, covered with very small scales; conical teeth in the jaws, on the vomer and the palatine bones. Dorsal and anal fins long, confluent with the caudal, without spines. Ventrals two-rayed, situated below the eye. Gill-openings wide; branchiostegals six.

Coast of Chile.

1. Genypterus chilensis.

Conger chilensis, *Guich. in Gay, Hist. Chil.* ii. p. 339 (Genypterus nigricans, *Phil.*) (Congrio).

Lips thick. Black; sides and anal fin with white spots.

29. ZOARCES*.

Zoarces, *Cuv. Règne Anim.*; *Cuv. & Val.* xi. p. 450.

Body elongate, with the scales rudimentary; snout of moderate extent; conical teeth in the jaws, palate smooth. Dorsal fin long, with a depression on the tail, which is formed by a series of spines much shorter than the rays; no other spines, either in the dorsal or in any of the other fins; dorsal and anal fins running round the extremity of the tail, without a distinct caudal fin. Ventrals short, formed by three or four rays. Gill-openings wide; pseudobranchiæ present; branchiostegals six; air-bladder and pyloric appendages absent.

Temperate seas of Northern Europe and America. The European species viviparous.

1. **Zoarces viviparus.**

Mustela vivipara et marina, *Schonev.* pp. 49, 50. tab. 4. fig. 2; *Jonston,* tab. 46. fig. 8; *Willughby,* p. 122. tab. H. 3. fig. 5; *Ray,* p. 69.

Lumpen, *Willughby,* p. 120. tab. H. 1.

Guffer, Ealpout, *Sibbald, Scot. Illustr.* iii. p. 25. pl. 19. fig. 3.

Blennius, sp. 7, *Artedi, Synon.* p. 45.

Blennius viviparus, *L. Syst. Nat.* i. p. 443, and *Mus. Ad. Fried.* p. 69. pl. 32; *Kon. Vetensk. Akad. Handl.* 1748, p. 37. t. 2, and *Faun. Suec.* p. 113; *Bl.* iii. 2. p. 262. tab. 72; *Bl. Schn.* p. 170; *Müll. Zool. Dan.* ii. p. 23. pl. 67; *Walb. Art. Ren.* iii. p. 185; *Retz. Faun. Suec.* p. 325; *Siemsen, Fische Mecklenb.* p. 26; *Donov. Brit. Fishes,* ii. pl. 34; *Turton, Brit. Faun.* p. 93; *Low, Faun. Orcad.* p. 204; *Shaw, Zool.* iv. p. 182.

Enchelyopus, sp., *Klein, Miss.* iv. p. 57. n. 12. tab. 15. fig. 1; *Gronov. Zoophyl.* n. 265, and *Mus. Ichth.* i. p. 65.

Viviparous Blenny, *Penn. Brit. Zool.* iii. p. 184. pl. 37, and edit. 1812, iii. p. 283. pl. 41.

Blennius ovoviviparus, *Lacép.* ii. p. 496.

Gunellus viviparus, *Flem. Brit. An.* p. 207.

Zoarces viviparus, *Cuv. Règne Anim.*; *Jenyns, Man.* p. 384; *Yarrell, Brit. Fishes,* 1st edit. i. p. 243, 2nd edit. i. p. 273, 3rd edit. ii. p. 380; *Nilss. Prodr.* p. 105; *Cuv. & Val.* xi. p. 454; *Parn. Wern. Mem.* vii. p. 237.

Zoarcæus viviparus, *Ekström, Fische Mörkö, ed. Creplin,* p. 241; *Fries och Ekstr. Skand. Fisk.* p. 36. taf. 8. fig. 1; *Nilss. Skand. Faun.* iv. p. 203.

Enchelyopus viviparus, *Gronov. Syst. ed. Gray,* p. 100.

B. 6. D. 78 | 10 | 20–21. A. 84–85. V. 3.

The height of the body is about one-ninth of the total length.

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* 1. Enchelyopus, sp., *Gronov. Zooph.* n. 266. p. 77.—Blennius americanus, *Bl. Schn.* p. 171.—Zoarces gronovii, *Cuv. & Val.* xi. p. 469.—Enchelyopus americanus, *Gronov. Syst. ed. Gray,* p. 101.—Coast of America.—This fish belongs probably to another genus.

2. Blennius polaris, *Sabine, Suppl. to Parry's First Voy.* p. 222; *Ross, App. to Parry's Polar Voy.* p. 200, and *App. to the Narrat. of a Second Voy.* p. 52. n. 8.—Zoarces polaris, *Richards. Faun. Bor. Amer. Fishes,* p. 94. Arctic coasts of North America.—This fish is not a *Zoarces.*

Brownish-grey, irregularly marbled with reddish-brown; a series of dark spots along the base of the dorsal fin.

German Ocean. Baltic, southwards to the British Channel.

a. Adult: stuffed. English coast.
b. Adult female with young. Greenwich. Presented by W. Yarrell, Esq.
c. Adult. London market.
d, *e*. Adult: stuffed. Frith of Forth.
f, *g*, *h*–*k*, *l*–*m*. Adults, half-grown, and young. Frith of Forth.
n. Fine specimen. Baltic. Presented by Prince Max of Neuwied.
o–*p*. Adult: skins.
q–*r*. Adult and half-grown: skins. From Gronow's Collection.
s. Young.

2. Zoarces anguillaris.

Blennius anguillaris, *Peck, Mem. Amer. Acad.* ii. pt. 2. p. 46. fig. 3.
—— labrosus, *Mitch. Lit. & Phil. Trans. New York,* i. p. 375. pl. 1. fig. 7.
Zoarces labrosus, *Cuv. & Val.* xi. p. 466. pl. 342; *Cuv. Règne Anim. Ill. Poiss.* pl. 79. fig. 1.
—— anguillaris, *Storer, Report Fishes Massachuss.* p. 66; *Dekay, New York Fauna, Fishes,* p. 155. pl. 16. fig. 45.

Variety.

Blennius ciliatus, *Mitch. l. c.* p. 374. pl. 1. fig. 6.
Zoarces fimbriatus, *Cuv. & Val.* xi. p. 468; *Dekay, l. c.* p. 156. pl. 16. fig. 44.

D. 92–97 | 21–16 | 12–22 (or 125–135). A. 103–110. V. 4.

Brownish, marbled with darker; an oblique blackish streak from the eye to the angle of the præoperculum.

Atlantic coasts of the northern parts of the United States.

a. Large specimen. Boston. Presented by W. Winstone, Esq.

30. NEMOPHIS.

Nemophis, *Kaup, Proc. Zool. Soc.* 1858, p. 168.

Tail exceedingly elongate, compressed; body naked; snout of moderate extent, mouth very small. Both jaws with canine teeth; those of the lower jaw exceedingly long, moving in a channel of the upper jaw. Dorsal and anal fins exceedingly long, without a distinct spinous portion, surrounding the extremity of the tail; caudal and ventral fins absent. Gill-opening reduced to a small foramen on the side of the neck.

Hab. ——?

1. Nemophis lessonii.

Kaup, l. c.

The dorsal fin commences behind the eye, which is rather large. Silvery; dorsal and anal fins blackish.

The typical specimens, nine Par. inches long, are in the Museum of the Jardin des Plantes. The position of this singular fish cannot be exactly determined, the description given being very insufficient. Dr. Kaup calls it a new genus of riband-shaped fishes, with which, however, it has nothing in common except the elongate form, so far as we can learn from his description.

31. PSEUDOBLENNIUS.

Pseudoblennius, *Schleg. Faun. Japon. Poiss.* p. 313.

Body slightly elongate, naked; snout somewhat produced, with the cleft of the mouth wide; a band of cardiform teeth in the jaws, none on the palate. Two separate dorsal fins, the rays of the second and of the anal not branched; caudal distinct; ventral with two soft rays, thoracic. Branchiostegals six.

Sea of Japan.

1. Pseudoblennius percoides.

Pseudoblennius, *Schleg. l. c.*
Pseudoclinus, *Schleg. l. c.* pl. 79 A. figs. 2, 3.

B. 6. D. 10 | 18. A. 16.

A tentacle above the orbit. Brownish, marbled with darker: fin-rays dotted with brown.

Bay of Oomura.

Fam. 25. ACANTHOCLINIDÆ.

Body elongate, low, compressed, covered with small scales. One dorsal fin, occupying nearly the whole of the back, by far the greater part being composed of spines; *anal fin long, with the number of the spines exceeding that of the rays; ventrals jugular, composed of a few rays.* Dentition complete. Four gills, pseudobranchiæ. Air-bladder none; pyloric appendages none. Vertebræ 12/18.

Coasts of New Zealand. Carnivorous fishes.

Only one genus.

1. ACANTHOCLINUS.

Acanthoclinus, *Jenyns, Zool. Beagle.*

Body elongate, compressed, covered with very small scales. Cleft of the mouth lateral, of moderate width; bands of small teeth in the jaws, on the vomer, the palatine bones, and on the tongue. Dorsal and anal fins long, the greater portion of both being composed of spines; soft rays in small number. Caudal rounded. Ventrals jugular, composed of one spine and three rays. Several lateral lines.

Six branchiostegals; the gill-membranes united below the throat; four gills; pseudobranchiæ. Air-bladder none. Pyloric appendages none; intestines short.

Carnivorous fishes, from the coasts of New Zealand.

1. **Acanthoclinus littoreus.**

Blennius littoreus, *Forst. Descr. Anim. ed. Licht.* p. 127.
—— quadridactylus, *Bl. Schn.* p. 177.
Clinus littoreus, *Cuv. & Val.* xi. p. 389.
Acanthoclinus fuscus, *Jen. Zool. Beagle, Fishes,* p. 92. pl. 18. fig. 2.

B. 6. D. $\frac{20}{4}$. A. $\frac{9-10}{4-3}$. V. 1/3.

Reddish-brown, brown, or blackish; a dark-brown spot on the operculum. Immature specimens with two oblique blackish streaks from the eye to the operculum, and with whitish dots on the body. A lateral line along the base of the dorsal fin, another along the middle of the body, a third from below the pectoral along the base of the anal; a fourth pair along the middle of the belly.

Coasts of New Zealand.

a. A great number of adult, half-grown, and young specimens. Bay of Islands.
b. Adult male: skeleton. New Zealand. From Dr. Sinclair's Collection.

Forster's description agrees so well with this species, that we can scarcely doubt that, owing to some inadvertence, he has given the numbers of the fin-rays incorrectly; and this is the more probable as in his original figure the number of the dorsal and anal spines is nearly correct. He has figured a young individual, in which the lateral stripes of the head are visible.

Stomach elongate, without cæcal portion; pyloric appendages none; intestine short, with an upper and lower curve. The liver is situated on the right side of the stomach; the gall-bladder is elongate, situated behind the liver, towards the extremity of the abdomen. Air-bladder absent.

Skeleton.—The skeleton does not show any peculiarity. The bones are well ossified. Skull rather compressed; crown of the head smooth, convex, with a small crest posteriorly; interorbital space very narrow; infraorbital bones well developed, forming a ring, which is nearly of the same width throughout; intermaxillary much shorter than the maxillary, with the posterior processes of moderate length; maxillary very dilated posteriorly; præoperculum rounded, both its limbs having the same length; operculum regularly triangular. Pubic bones narrow, rather elongate, firmly united, without interspace between them. Twelve abdominal and eighteen caudal vertebræ, the length of the former portion of the vertebral column being to that of the latter as 1 : 1·26. Hæmal, neural, interhæmal and interneural spines, and the ribs of moderate strength and length.

Fam. 26. COMEPHORIDÆ.

Gobioidei, part., *Cuv.*

Body elongate, naked; eye lateral. Teeth small. Two dorsal fins, the anterior of which is much less developed than the second, which equals the anal fin. Ventrals none. No prominent papilla near the vent. Gill-opening wide; six branchiostegals, four gills; air-bladder and pyloric appendages none. Skeleton very soft; opercular pieces not distinct; number of the vertebræ in the single species known at present 8/35.

Lake Baikal.

The only genus known approaches, in several characters, the family of *Scombridæ*, and among these especially the group of *Scombrina*; but the habit of this fish, the locality in which it is found, and, above all, the structure of the skeleton appear to indicate it as the type of a separate family.

1. COMEPHORUS.

Comephorus, *Lacép.* ii. p. 312; *Cuv. & Val.* xii. p. 327.

Body elongate, naked; head large, with the snout produced, broad and depressed, and with the cleft of the mouth very wide. Eye of moderate size. Teeth minute, in the jaws, on the vomer and the palatine bones. Rays of the second dorsal fin and of the anal simple, and not articulated. Pectorals very long; caudal emarginate.

Lake Baikal.

1. Comephorus baikalensis.

Callionymus baikalensis, *Pall. Reise*, iii. p. 290, and *App.* p. 707; *Nov. Act. Petropol.* i. p. 349. pl. 9. fig. 1.

Comephorus baikalensis, *Lacép.* ii. p. 313; *Cuv. & Val.* xii. p. 329. pl. 361; *Cuv. Règne Anim. Ill. Poiss.* pl. 82. fig. 2.

D. 8 | 28. A. 34. Vert. 8/35.

Pectoral longer than the head. Uniform greenish.

Lake Baikal.

Fam. 27. TRACHYPTERIDÆ.

Tænioidei, part., *Cuv., Müll., Owen.*
Gymnetridæ, *Gray, Syn. Brit. Mus.* 1842, p. 149.

Body elongate, strongly compressed, naked; eye lateral; cleft of the mouth small, with the dentition feeble. One dorsal fin, occupying the whole length of the back, with a detached anterior portion, and composed of flexible rays which are neither articulated nor branched. Anal absent; caudal not in the longitudinal axis of the fish, or rudimentary; ventrals thoracic. Gill-opening wide; branchiostegals six; gills four; pseudobranchiæ well developed, situated in a pouch formed by a fold of the mucous membrane (*Trachypterus*). Pyloric appendages in exceedingly large number. Vertebræ in large number. Bones soft; muscles little coherent.

Deep-sea fishes, found at present on the shores of the Atlantic and Mediterranean; one species in the East Indies, another on the west coast of South America, a third from New Zealand. Probably they have a much wider range; but their being so rarely thrown on shore and their speedy decomposition have prevented naturalists from observing them. It is very difficult to obtain specimens, and nearly impossible to find perfect ones. Nothing is known of their development, and of the changes they undergo with age. Only a few specimens have been carefully examined; and in several species I shall be obliged to restrict myself to an abstract from the original accounts.

Synopsis of the Genera.

Ventrals fins well developed	1. TRACHYPTERUS, p. 300.
Tail produced into an exceedingly long filament ...	2. STYLOPHORUS, p. 306.
Each ventral fin reduced to a long filament	3. REGALECUS, p. 307.

1. TRACHYPTERUS.

Tænia, part., *Artedi, Synon.* p. 114.
Trachypterus, *Gouan, Hist. Poiss.* pp. 104, 153; *Cuv. & Val.* x. p. 313.

Ventral fins well developed, composed of several more or less branched rays.

Coasts of Europe. West coast of South America.

1. Trachypterus spinolæ.

Trachypterus spinolæ, *Cuv. & Val.* x. p. 328. pl. 296.

D. 7 | 137–139 (–160). A. 0. C. 7/5. P. 11. V. 1/4.

The height of the body is one-fourth of the total length, the length of the head one-fifth; a series of two or three blackish blotches on the side of the body.

The upper profile descends rapidly from above the eye to the snout. The anterior seven dorsal rays are separated from the remainder of the fin by a deep notch, and are very elevated. Seven of the caudal rays are inserted on the upper part of the extremity of the tail, forming a separate caudal lobe, obliquely directed upwards; the other rays are short, pointing backwards. There is a small spine on the part of the tail which is opposite to the caudal lobe. Pectorals very short; ventral rays elongate, exceedingly frail. Silvery: two or three blackish spots on the upper part of the back.

Typical specimens 2 to 3 inches long.

Nice.

A specimen in the British Museum, five inches long, and said to be from the Atlantic Ocean, I consider as belonging to this species. Its greatest depth is at the nape of the neck, and is contained three times and a half in the total length (without caudal fin). The number of the dorsal rays, besides the anterior ones, which are detached, is 160, that is, twenty more than in Valenciennes' specimen; but I do not think that, in fishes in which the rays are so exceedingly numerous, their number is as constant, within the limits of one species, as in fishes with fewer dorsal rays.

2. **Trachypterus cristatus.**

Trachypterus cristatus, *Bonelli, Mem. Accad. Torino*, xxiv. p. 485. pl. 9.
—— bonellii, *Cuv. & Val.* x. p. 331.

D. 6 | 114. A. 0.

The lower profile of the trunk is much more prominent than that of the tail, which is comparatively narrow and slender. The upper portion of the caudal fin forms an erect lobe; lateral line spiny. Silvery: fins red; two blackish spots on the dorsal crest, and five on the posterior half of the dorsal fin.

Gulf of Spezzia.

The typical specimen, which has much the appearance of a deformed fish, is in the Museum at Genoa. Risso, however, appears to describe a similar, if not the same, fish, under the name of *Gymnetrus müllerianus* (Wiegm. Arch. 1840, p. 13). He says, "La plus grande hauteur aux pectorales est presque la moitié de la longueur du corps depuis les ouïes jusqu'à l'anus, s'amincit ensuite tout-à-coup en se rétrécissant jusqu'à l'extrémité caudale."

3. **Trachypterus gryphurus.**

Lowe, Proc. Zool. Soc. 1850, p. 248.

B. 6. D. 5 | 166. P. 10–11. V. 1/5. C. 8/5.

The height of the body is contained five times and a half in the total length. Lateral line without spines. A series of three blackish blotches along the side of the body.

Madeira.

Description.—"Intermediate between *T. tænia* and *T. iris*, approaching perhaps nearest to the latter, but differing in its deeper shape, its depth being two-elevenths of the total length, and in the backwarder position of the third dark side-spot. The ventral fins are short, only equalling one-twelfth of the body, without the caudal fin, and the first four produced rays of the first dorsal are equal in length to the ventral fins. The lateral line ends as in Cuvier and Valenciennes' figure (t. 297) of *T. iris*, but is quite unarmed. The ventral line is serrulate; and the whole surface, particularly towards the ventral line, is finely shagreened or granulate, the granulations becoming stronger towards the ventral line, as in the same figure. In shape and proportions it agrees better with *T. tænia*, but differs in several important particulars from Cuvier and Valenciennes' description of that fish. The only individual examined occurred in June 1845, and has been added by me to the Collection of the Cambridge Philosophical Society. It was scarcely quite dead when I first saw it, and was in the most perfect state of preservation. Another *Trachypterus* had occurred in June 1844, and was probably the same species; but the example was unfortunately thrown away by the person to whom it had been missent, without my seeing it. It was said to have been about three feet long. The whole body is pure bright silver, appearing as if frosted, from the fine granulations of the surface. The fins are of a delicate scarlet or vermilion, the lower point or angle of the caudal being tipped, and the hinder end of the dorsal edged with black. On the sides are three blackish oval or elliptic spots. This example was twenty-five inches long, exclusive of the caudal fin, which resembles a bat's or griffon's wing, and is erected in a fan-like manner; the lower lobe or portion being suppressed or undeveloped, and only indicated by the presence of five short spinules or abortive rays." (*Lowe.*)

4. Trachypterus tænia.

Falx Venetorum, *Bellon. Aquat.* p. 137; *Aldrov. Pisc.* p. 370.
Tænia altera, *Rondel.* p. 327; *Artedi, Synon.* p. 115 (nos. 2 & 4).
Cepola trachyptera, *L. Gm.* i. p. 1187.
Trachypterus tænia, *Bl. Schn.* p. 480.
Gymnetrus lacepedii, *Risso, Ichth. Nice,* p. 146. pl. 5. fig. 17.
Trachypterus falx, *Cuv. & Val.* x. p. 333.

B. 6. D. 8 | 162–168. A. 0. C. 8/6. P. 11. V. 1/7.

The greatest depth of the body is near, or at, the occiput, and is contained five times and a quarter in the total length (without caudal). Lateral line spiny. A series of three blackish blotches along the side of the back, and sometimes one or two paler ones on the side of the abdomen.

Seas of Messina, Nice, and Algiers.

The greatest height of the body is at or near the occiput, and contained five times and a quarter in the total length (without caudal). Muzzle truncated; cleft of the mouth vertical; the upper jaw very protractile. Six or eight small teeth in each of the jaws, three or four on the vomer; palatines with some asperities. The eye occupies the middle third of the length of the head, near to the upper profile. Interoperculum nearly as large as the operculum; the gill-opening extends to the vertical from the eye. Pectorals very short; ventrals about as long as the body is high. The anterior six dorsal rays are elevated; the others have a rough surface, and there is a small spiny tubercle at the base of each of them. Eight of the caudal rays are inserted on the upper part of the extremity of the tail, forming a separate caudal lobe, obliquely directed upwards; the outer rays of this lobe are longer and stronger than the intermediate ones, and have their surface rough; the other caudal rays are short, pointing backwards. Lateral line with a series of small bony shields, each of which is armed with a spine; a double series of small tubercles along the cutting edge of the abdomen. The lateral line gradually descends towards the lower profile, which it reaches at the extremity of the tail, where it becomes confluent with the lateral line of the other side; there is a spine at the point of the junction of the two lateral lines, with a process directed forwards, and another directed backwards. The vent is situated a little before the middle of the length. Silvery, with three blackish spots on the back, and sometimes with one or two paler ones on the side of the abdomen. Fins rose-coloured.

Typical specimens nine to twenty inches long.

A specimen in the Collection of the College of Surgeons, nine inches long, and named *Trachypterus cristatus*, probably belongs to this species. It is without any spots, and has 150 rays in the dorsal fin.

5. Trachypterus altivelis.

Kner in Wien. Sitzungsber. 1859, xxxiv. p. 437. taf. 1.

B. 6. D. 7 | 190. A. 0. C. 6/4–6. P. 11. V. 7.

The greatest height of the body is above the ventral fins, equal to the length of the head, and one-seventh of the total. Form of the head as in *T. tænia*. Eight teeth in the upper, and six in the lower jaw. The anterior dorsal rays elevated; the longest of the second dorsal fin are not much lower than the body; dorsal rays rough, and there is a small spine at the base of each of them. Form of the caudal fin and tubercles of the skin as in *T. tænia*. Silvery, with three large round black spots below the dorsal fin; a fourth near the abdominal edge, a little behind the first on the back.

Valparaiso.

The typical specimen is in the Vienna Museum.

6. Trachypterus iris.

Tænia falcata, (*Imperato*) *Aldrov.* iii. c. 30. p. 371.
—— prima, *Rondel.* xi. cap. 17. p. 326; *Ray*, p. 39; *Artedi, Synon.* p. 114.
Ichthyopolis romanis Cepole dicta, *Willughby*, p. 116.
Cepola iris, *Walb. Artedi*, iii. p. 617.
Epidesmus maculatus, *Ranzani*, *Opusc. Scient. d'Ital.* ii. p. 133.

Regalecus maculatus, *Nardo, Giorn. di Fis.* dec. ii. tom. vii. p. 116. pl. 1. fig. 1.
Trachypterus iris, *Cuv. & Val.* x. p. 341. pl. 297.

B. 6. D. 6 | 170. A. 0. C. 8/6. P. 11. V. 1/7.

The greatest height of the body is at or near the occiput, and one-ninth or one-tenth of the total length. Dorsal rays rough. In every other respect similar to *T. tænia.*

Coasts of Messina and Corsica.

Typical specimens two to three feet long.

7. Trachypterus liopterus.

? Bogmarus aristotelis, *Risso, Eur. Mérid.* iii. p. 297.
Trachypterus leiopterus, *Cuv. & Val.* x. p. 342.

D. 6 | 170–174. A. 0. C. 8/6. V. 1/7. Vert. 90–91.

The height of the body is one-ninth or one-tenth of the total length. Dorsal rays without any asperities. Two spots only on the back, the anterior of which is situated in the first sixth of the total length, the posterior in the second. In every other respect similar to *T. tænia.*

Coasts of Naples, Nice, and Toulon.

Typical specimens forty to forty-five inches long. One of the specimens examined was a female.

Pyloric appendages innumerable ; air-bladder none.

a. Fifty-eight inches long : stuffed. Mediterranean.

8. Trachypterus rüppellii.

D. 6 | 135. A. 0. C. 8. V. ? P. 10.

The height of the body is contained eight times and a half in the total length. Dorsal rays smooth ; lateral line spiny ; a black spot on the anterior half of the body.

The form of the head is nearly the same as in *T. tænia.* The greatest depth of the body is somewhat before the middle of the total length, and is contained eight times and a half in it. Four pointed teeth, inclined backwards, on each side of the upper and lower jaws : the vomer forms a projecting protuberance within the cavity of the mouth, and is armed anteriorly with two teeth pointing backwards, one of which is considerably larger than the other. Similar teeth on the upper and lower pharyngeal bones, the latter being narrow and having only a single series of teeth. Palatine bones entirely smooth. The dorsal spines are perfectly smooth, those in the middle being not quite one-half the depth of the body. The caudal fin is composed of eight rays, the outer ones being the strongest : the fin is so joined to the last vertebra that motion in any direction is possible* : there are no other rudimentary rays below it. Lateral line armed, and running as in *T. tænia*, but terminating in a series of about five imbricate spines on the lower part of the extremity of the tail. The edge of the belly without any tubercles or papillæ. The vent is situated before the middle of the total length. Silvery: a very distinct black spot at the commencement of the second fifth of the total length; there is a second, very indistinct spot, which, if present at all, appears to be situated after the commencement of the second fifth of the length.

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* It is a true caudal fin, the longitudinal axis of which is identical with that of the last vertebra ; I cannot therefore agree with Kner, who is inclined to consider this fin as a terminal *dorsal* fin (Wien. Sitzungsber. 1859, xxxiv. p. 439).

Mediterranean.

A specimen from the Mediterranean, fifty-one inches long, and comparatively in a good state of preservation, has been presented to the British Museum by Dr. E. Rüppell as *Bogmærus aristotelis*, Risso. The dorsal crest and the pectoral and ventral fins are mutilated, as is usual in those fishes. The following are the measurements:—

	inches.
Total length (without caudal fin)	51
Caudal fin	5½
Height of the body	6
Length of one of the middle dorsal rays	2½
Distance of the snout from the vent	24
Distance of the snout from the anterior dorsal spot	10
Distance of the snout from the posterior dorsal spot	22

9. **Trachypterus arcticus.**

The Deal-fish.

Vogmeri or Vaagmär, *Olafs. Islænd. Reise*, § 684. tab. 43.

Gymnogaster arcticus, *Brünn. Nye Saml. Dansk. Vidensk. Selsk. Skr.* iii. p. 408. tab. B. figs. 1–3; *Faber, Fische Isl.* p. 66; *Nilss. Prodr.* p. 107; *Walb. Artedi*, iii. pl. 3 (cop. from *Brünnich*).

Bogmarus islandicus, *Bl. Schn.* p. 518. tab. 101.

Gymnetrus arcticus, *Cuv. Règne Anim.*; *Flem. Mag. Nat. Hist.* iv. p. 215. fig. 34; *Jenyns, Brit. Vert.* p. 372.

Trachypterus bogmarus, *Cuv. & Val.* x. p. 346; *Yarr. Brit. Fishes*, 1st edit. i. p. 191, 2nd edit. i. p. 210, 3rd edit. ii. p. 282; *Barker, Proc. Zool. Soc.* 1851, pp. 116, 119; *Gaimard, Voy. Isl. et Grönl. Zool. Poiss.* pl. 12.

—— vogmarus, *Reinh. Vidensk. Selsk. Skr.* vii. D. p. 71, cum fig.; *Liljeborg, Ofvers. af Vet. Akad. Förh.* 1849, p. 33; *Duguid in Proc. Zool. Soc.* 1851, p. 116.

Vogmarus islandicus, *Reid, Ann. & Mag. Nat. Hist.* iii. 1849, p. 456. pl. 16.

Trachypterus arcticus, *Nilss. Skand. Faun. Fisk.* p. 162.

B. 6. D. 172 (160 *Nilss.*). A. 0. C. 8/? P. 10–11. V. 6.

The greatest depth of the body is at its middle, and contained five times and a half in the total length; dorsal rays smooth; lateral line spiny; a series of two blackish blotches on the side of the body.

Seas of Iceland, of the Orkneys (Sanda), and of northern Norway.

The greatest height of the body is at its central part, where it is contained five times and a half in its length, while the height at the nuchal region is nearly one-seventh of the total, or equal to the length of the head. Muzzle truncated, cleft of the mouth subvertical; the upper jaw very protractile. The maxillary teeth are thin, conical, and pointed, nearly recumbent, with the apex turned towards the pharynx: two on each side of the upper jaw, three or four on each side of the lower; one or two single pointed teeth on the vomer, none on the palatine bones. The superior pharyngeal bones are studded with pointed curved teeth. [*The inferior pharyngeals are wanting altogether.*] The eye is situated near the frontal profile, and its diameter is two-sevenths of the length of the head. Interoperculum nearly as large as the operculum. The short pectoral fin is situated nearer to the ventral margin than to the lateral line. The anterior five dorsal rays are somewhat detached from the others, and appear to be produced; the rays are quite smooth, slender, flexible, without the slightest trace of transverse joints; they are dilated inferiorly into a saddle-shaped shield, with a short curved point in the centre; a number of small sharp bodies appear along the root of the fin. The vertically-raised caudal fin contains eight rays, the outer ones of which are longer than the six middle ones; the two central rays are studded with minute spines. There are several rudimentary rays at the extremity of the tail. Firm papillary warts along the abdominal margin. The lateral line is armed as in *T. tænia*, and is confluent with that of the other side beneath the end of the tail; a stronger spine indicates the point of junction. The vent is situated somewhat behind the middle of the length. Silvery, with two blackish spots; fins reddish; the anterior spot is situated at the commencement of the second fourth part of the whole length of the fish, the posterior being near the middle.

The above characters have been taken from the excellent accounts of Professors Reinhardt and Nilsson. The specimens show a length of from two feet and a half to six. One stuffed specimen is in the Collection of the British Museum, but it is not in a good state of preservation.

a. Five feet ten inches long, one foot high. Dorsal spines 162. Purchased.

2. STYLOPHORUS.

Stylephorus, *Shaw, Trans. Linn. Soc.* i. p. 90.

Ventral fins none. Tail terminating in an exceedingly long cord-like appendage.

Gulf of Mexico.

1. Stylophorus chordatus.

Shaw in Trans. Linn. Soc. i. p. 90. pl. 6, and *Zool.* iv. p. 87, and *Nat. Misc.* viii. pl. 274; *Blainv. Journ. Phys.* lxxxvii. p. 60. pl. 1. fig. 1; *Cuv. & Val.* x. p. 381.

B. 4. D. 110. C. 6. P. 13.

The height of the body is one-fifteenth of the total length (without caudal appendage), the length of the head one-sixth. The snout is produced, subcylindrical; the mouth small and toothless. The maxillary bones are small, short, and hidden behind the intermaxillaries; the mandibles are long, extending far behind the eye. Eyes large, close together, directed forwards towards the snout. The suborbital is very large, covering nearly the whole of the cheek, and extending backwards behind the eye. Opercles small. Gill-openings very wide; gills four. The vent is situated before the middle of the total length. The pectorals are pointed, directed upwards, about half as long as the head; the dorsal extends from the head nearly to the end of the tail. The caudal is directed upwards, and has its rays connected by a rather firm membrane; the tail terminates in a narrow band-like appendage about twice as long as the body. The colour is uniform silvery.

The single specimen known is in the collection of the College of Surgeons; it is eleven inches long, the appendage being twenty-two inches. It was taken in the sea between Cuba and Martinique.

3. REGALECUS.

Regalecus, *Brünn. Nya Saml.* iii. p. 414.
Gymnetrus, *Bl. Schn.* p. 481; *Cuv. & Val.* x. p. 352.

Each ventral fin reduced to a long filament, dilated at the extremity; caudal fin rudimentary or absent.

Seas of Europe; Atlantic; Vizagapatam; New Zealand*.

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* Our knowledge of the occurrence of this genus in the seas of New Zealand rests on the following notice, which appeared in a New Zealand newspaper. The parts of the specimen captured, which were preserved, have been transmitted to the British Museum, but have not yet arrived:—

"Nelson, October 26, 1860.

"The following few notes relative to the singular fish which on Wednesday last ran ashore near the entrance of the harbour may not be uninteresting; they are compiled partly from information given to me by persons who saw the fish, and partly from my own observation of such of the remains as I was able to see. The head was very small, not more than ten inches in length, resembling in shape that of the Mohiki. From the lower lip depended a large number of rigid slender barbules, about sixteen inches long and of a brilliant red colour. The eye was as large as that of a bullock, protruding considerably, and very bright. The jaws appeared to be entirely destitute of teeth. Unfortunately the head had been so much damaged (by being beaten with stones) before I saw any part of it, that I am unable to give any more detailed description of it. The body, from the head to the extremity of the tail, measured fifteen feet ten inches; at the back of the head it was about ten inches deep, which gradually increased to fourteen inches three feet further on. It retained the same depth for about ten feet, and then tapered gradually to the extremity of the tail, which was pointed, and, as my informant stated, destitute of fin. The whole body of the fish was extremely flat, varying from two to four inches in its whole length, attaining its greatest thickness (four inches) about the middle of its length, along the course of the spine.

"From behind the head ran a long unbroken dorsal fin, two inches wide there, gradually increasing in width to four inches in the middle of the fish, and then tapering to one inch near the extremity of the tail, where it terminated. This fin was supported, at intervals of about three-quarters of an inch, by slender spinous

1. Regalecus gladius.

Spada marina, *Imperato,* p. 587.
Cepola gladius, *Walb. Art.* iii. p. 617.
Gymnetrus longeradiatus, *Risso, Eur. Mérid.* iii. p. 296.
—— gladius, *Cuv. & Val.* x. p. 352. pl. 298.

B. 6. D. 340. A. 0. C.? P. 14. V. 1.

The length of the head equals the height of the body, which is contained five times and two-thirds in the distance of the vent from the snout, or one-nineteenth of the total length. The snout is truncated, the cleft of the mouth vertical, and the upper jaw very protractile. The eye is one-fourth of the length of the head, and situated in the anterior and upper half of the head. Head longer than high. A series of minute teeth in each of the jaws. The single ventral ray is very long, terminating in a broad lobe; there is another cutaneous flap on the second third of its length. The anterior twelve dorsal rays are produced, the first five forming a separate division above the eye; the seven following terminate in cutaneous lobes. Skin covered with small smooth tubercles; the lateral line runs along the lower third of the body. Silvery, with greyish spots.

Typical specimens eight to ten feet long.
Nice.

Pyloric appendages innumerable. Air-bladder none.

Gymnetrus capensis (Cuv. & Val. x. p. 376), from the Cape of Good Hope, does not appear to be specifically distinct from *R. gladius.*

a. Head, extremity of the tail, portions of the intestines, and one of the dorsal spines from the specimen captured at the Bermudas,

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rays, projecting about three-quarters of an inch beyond the margin of the fin. There were no other fins; but from the back of the head rose several rigid circular spines, about eighteen inches long, three-quarters of an inch in diameter at the base, tapering to a point, curving slightly backwards, hollow, and bristling along their whole surface with small spines directed upwards. These long spines appear to have been very brittle, as they broke off short when the fish struck the rock. The person who saw the fish run ashore described these spines as presenting the appearance of three small masts to a boat, through the whole length of the fish, disposed in pairs, as follows—one pair just below the back, and the other pairs immediately above; and below the spinal process ran six air chambers, about a third of an inch in diameter, apparently intended to keep the body of the fish in an upright position whilst swimming. The spine was a mere cartilage, filled with a glairy fluid; there being no bones in the fish, except those of the head, the dorsal spines, and the rays of the fin.

"The general colour of the body was very light grey, inclining to lavender on the back and towards the dorsal fin, at which latter point that colour became nearly positive. The whole of the body was covered with very minute soft scales, easily removed by friction with the hand, and of a brilliant silvery colour. Those parts of the head which I was able to save were of a bluish-grey. The fin was pinkish near the body, but the edge and the spinous rays were bright red. The spines were grey.

"The fish was full of spawn, the eggs perfectly round and transparent, and about the size of pearl-barley. The flesh was white, firm, and is described as good eating. It appears to be known to the natives, but under what name I am not aware. "W. T. L. Travers."

and presented by J. M. Jones, Esq. It probably belongs to this species; the spine is thirty-one inches long. See Proc. Zool. Soc. 1860, p. 185*.

2. Regalecus telum.

Gymnetrus telum, *Cuv. & Val.* x. p. 361. pl. 299.

D. 398. A. 0. C.? V. 1.

The height of the body is one-twenty-fourth of the total length. Eye situated in the anterior third of the head.

In every other respect similar to *R. gladius.*

Typical specimen six feet eight inches long.

Coast of Nice.

3. Regalecus banksii.

The Ribbon-fish. The Oar-fish.

? Gymnetrus hawkenii, *Bl.* xii. p. 88. taf. 425; *Lacép.* iii. p. 380.

? Gymnetrus hawkinsii, *Bl. Schn.* p. 481; *Cuv. & Val.* xii. p. 372.

Gymnetrus hawkenii, *Shaw, Zool.* iv. p. 197; *Couch, Trans. Linn. Soc.* xiv. p. 77; *Yarr. Brit. Fishes,* 2nd edit. i. p. 221, 3rd edit. ii. p. 302.

—— banksii, *Cuv. & Val.* x. p. 365; *Hancock, Ann. & Mag. Nat. Hist.* 1849, iv. p. 1. pls. 1 & 2 (excellent description, cop. in *Yarr. Brit. Fishes,* 3rd edit. ii. p. 293).

Regalecus glesne, *Gray, Proc. Zool. Soc.* 1849, p. 80, and *Ann. & Mag. Nat. Hist.* 1849, v. p. 501.

B. 6†. D. $\frac{12-15}{264-290}$. A. 0. C. 0. P. 11. V. 1.

The length of the head is one-sixteenth of the total, the height of the body one-thirteenth. The snout is truncated, the cleft of the mouth vertical, and the upper jaw very protractile. Teeth none. The eye is one-sixth of the length of the head, and situated in the anterior and upper half of the head. Head longer than high. Ventral ray fringed with a membrane. The anterior twelve or fifteen spines form an elevated crest. Four longitudinal flattened ridges extend from the head to the tail immediately above the lateral line, which cuts them off very obliquely in front. The surface of the skin of the body is studded with very numerous tubercles of bone; the largest and most elevated lie upon the ridges. On the ventral ridge are numerous irregular and prominent tubercles, slightly hooked backwards. The lateral line is marked by elongate flat scales, and runs along the lower third of the body. Silvery, with irregular, slightly waving, subvertical dusky-black lines and spots on the anterior part of the body.

British Seas.

a. Eleven feet long (tail mutilated; restored length twelve feet): stuffed. Redcar. (See Gray in Proc. Zool. Soc. 1850, p. 52.)

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* This account, from the pen of an author not accustomed to ichthyological descriptions, ascribes a swimming-bladder, filled with oily matter, to this fish, &c.! It adds, however, to its history the new fact of its occurrence at the Bermudas.

† I suppose that Hancock, who denies the presence of a suboperculum, but gives the number seven for the branchiostegals, the uppermost being a broadish plate marked by radiating lines, has taken the former for a branchiostegal.

The above characters have been taken from the elaborate account given by Hancock; he has also examined the internal parts of the female specimen which came under his observation, and found a very remarkable form of the stomach. This organ is prolonged into an exceedingly long cæcal portion, which, like the air-bladder of the *Labyrinthici*, *Ophiocephalidæ*, and of many Carangoid fishes, extends far backwards between the muscles of the tail, ending at a short distance from the caudal end of the fish.

Dr. Gray has traced the history of the British specimens, with their synonymy, to the earliest notices; but whilst he has proved beyond a doubt that the existence of a Ribbon-fish with biradiate ventrals rests only on the fancy of some artist, I should not think myself justified in doubting the statements of such trustworthy authors as Ascanius and Brünnich, who give the numbers of the dorsal spines as so different from those of *R. banksii*, that the fishes examined by them are certainly not identical with the latter.

Whether the Indian fish named by Bloch *G. hawkenii* is entirely the production of imperfect notices and figures sent to him from England, or whether a similar species (but not with biradiate ventrals) occurs in the East Indies (Goa) and still remains to be recognized, is a question which cannot at present be decided.

Regalecus banksii has been found only on the English shores, although it has probably a wider range. The following specimens appear to belong to this species:—

	Date.	Locality.	Size. feet.
a.	Jan. 22, 1759	Whitby	11⅓
b.*	Feb. 23, 1788	Newlyn	8⅓–8⅚
	Feb. 1791	Newlyn	8½
	1796 (*Russell*) .	Cornwall.	
	Feb. 1798	Cornwall	8½
c.	Mar. 27, 1794	Newcastle................	10
d.	Mar. 18, 1796 (*Banks*) .	Filey....................	13
e.	1800	Fern Islands	18
f.	1800	Fern Islands	14
g.	Mar. 1844	Crovie near Macduff........	12
h.	?1845	Yorkshire................?	24
i.	Mar. 26, 1849 (*Hancock*)	Cullercoats (Northumberland)	12¼
k.	1850	Redcar	12
l.	Sept. 17, 1852	Cromarty.	

4. **Regalecus glesne.**

The Sild-Kung (King of the Herrings).
Ophidium glesne, *Ascan. Nye Saml. Vid. Selsk. Skrivt.* iii. p. 419.
Regalecus glesne, *Ascan. Ic.* ii. tab. 11; *Lacép.* ii. pp. 214, 215.

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* Dr. Gray has shown that these different statements refer to one and the same specimen, the dates having been altered in copying or misprinting. The differences in size can be easily accounted for: the tail of the specimen being mutilated, several of the writers were desirous to give the length restored.

Regalecus remipes, *Brünn. Nye Saml. Vid. Selsk. Skrivt.* iii. p. 414. taf. B. figs. 4, 5, cop. *Walb. Artedi,* iii. p. 647. tab. 3. fig. 4.
Gymnetrus remipes, *Bl. Schn.* p. 482. tab. 88, cop. *Yarr. Brit. Fishes,* 2nd edit. i. p. 223, 3rd edit. ii. p. 301.
—— ascanii, *Shaw, Zool.* iv. p. 197.
—— glesne, *Cuv. & Val.* x. p. 366.
Regalecus glesne, part., *Gray, Proc. Zool. Soc.* 1849, p. 81.
Gymnetrus grillii, part., *Nilss. Skand. Faun. Fisk.* p. 169.

D. 8 | 126 (*Ascan.*), 8 | 160 (*Brünn.*). P. 14. A. 1.

Ventral filament very long, terminating in a cutaneous lobe. Skin with soft warts, arranged in three or four longitudinal bands.

Lindroth says that the fish is silvery, with blackish transverse stripes; but, perhaps, the species he saw was different from that seen by Ascanius.

It appears very doubtful whether the dorsal fin really was contiguous with a caudal.

Sea off Bergen.

5. Regalecus grillii.

The Sild-Kung.
Gymnetrus grillii, *Lindr. Vet. Akad. Handl.* 1798, p. 291. tab. 8; *Bl. Schn.* p. 482; *Nilss. Prodr.* p. 105; *Cuv. & Val.* x. p. 370; *Nilss. Skand. Faun. Fisk.* p. 169.
—— glesne, part., *Gray, Proc. Zool. Soc.* 1849, p. 81.

D. 406. P. 12. V. 1.

The height of the body is one-fifteenth of the total length, the length of the head one-eighteenth. Jaws toothless. Ventral filament terminating in a cutaneous lobe. Skin covered with soft warts, arranged in four longitudinal bands.

Sea off Hitteren, near Trondhjem. ? Sea off Alnmouth.

The typical specimen, considerably mutilated, is in the Zoological Museum at Stockholm.

This species also is said to have had the dorsal contiguous with the caudal fin.

Hancock mentions a fish, caught in January or February 1845, near Alnmouth, which, from the measurements given, would appear to belong to this species. It was 16 feet long and 11 inches deep.

6. Regalecus russellii.

Russell, i. pl. 40.
Gymnetrus russellii, *Shaw, Zool.* iv. p. 195. pl. 28; *Cuv. & Val.* x. p. 377.

D. 4–5 | 320. C. —? P. 11. V. 1.

The height of the body is one-twentieth of the total length. Teeth none. Caudal rays distinct.

Sea off Vizagapatam.

It is merely in consequence of a misinterpretation of the text and figure given by Russell, that Shaw describes the ventrals of this fish as biradiate.

Fam. 28. LOPHOTIDÆ.

Tænioidei, part., *Cuvier*.

Body elongate, strongly compressed, naked; eye lateral; cleft of the mouth narrow, with the dentition feeble. Vent situated near the extremity of the tail. One dorsal fin, occupying the whole length of the back, composed of flexible rays which do not show either articulated joints or branches. Anal short; caudal in the longitudinal axis of the fish; ventrals thoracic. Gill-opening wide; branchiostegals six; gills four; pseudobranchiæ. Muscles coherent.

Although the fishes of this family are of very rare occurrence in the Mediterranean and in the sea of Japan (the only localities in which they have been hitherto found), we do not think that they inhabit as great depths as the *Trachypteridæ*, their bony and soft parts being of a much firmer consistence and well coherent. They appear to feed on other marine animals.

1. LOPHOTES.

Lophotes, *Giorna, Mem. Accad. Torino,* ix. 1803, p. 19; *Cuv. Règne An.*

Head elevated into a very high crest, at the anterior extremity of which the dorsal fin commences. The vent is situated near the extremity of the tail; a small anal fin behind it; ventrals and caudal small, the former thoracic. Mouth not protractile, subvertical. Teeth in the jaws, on the vomer, and on the palate. Air-bladder present.

Mediterranean. Sea of Japan.

1. **Lophotes cepedianus.**

Giorna, Mem. Accad. Torino, 1803, ix. p. 19. pl. 11. fig. 1; *Cuv. Ann. Mus.* xx. p. 393. pl. 17; *Cuv. & Val.* x. p. 405. pl. 301.

B. 6. D. 230. A. $\frac{3}{15}$. C. 17. P. 15. V. 1/5.

The first dorsal spine compressed, exceedingly strong, and elongate. Silvery, fins rose-coloured.

Mediterranean.

a. Fifty-eight inches long: stuffed. Old Collection.
b. Three feet long. Presented by Sir A. Smith.

This species, or one most closely allied to it, occurs in the Seas of Japan. It has been named *Lophotes capellei*, Schleg. Faun. Jap. Poiss. p. 132. pl. 71. The characters by which it is distinguished from the Mediterranean species appear to be the more doubtful as the description is taken from a figure.

Fam. 29. TEUTHIDIDÆ.

Teuthyes, part., *Cuv. Règne Anim.*; *Müll. Berl. Abhandl.* 1844, p. 201.

Body compressed and oblong, covered with very small scales. Lateral line continuous; tail not armed. Eye lateral, of moderate size. A single series of trenchant incisors in the jaws; palate smooth. One dorsal fin, the spinous portion being the more developed; anal with seven spines. Ventral fins thoracic. Pseudobranchiæ well developed.

Herbivorous fishes, inhabiting the tropical seas of the East Indian region and the Western parts of the Pacific.

The fishes of this family have some affinity to the *Sparidæ* and *Acronuridæ*, from which they differ in the structure of the fins.

Only one genus.

1. TEUTHIS*.

Teuthis, sp., *L. Syst. Nat.* i. p. 507.
Siganus, *Forsk. Descr. Anim.* p. 25.
Centrogaster, *Houttuyn, Act. Soc. Harlem.* xx. p. 333.
Amphacanthus, *Bl. Schn.* p. 206; *Cuv. & Val.* x. p. 115.
Teuthis, *Cant. Catal.* p. 207.

Teeth small, denticulated, in a single series. The ventral fins with an outer and an inner spine, and with three soft rays between; formula of the fins, D. $\frac{13}{10}$, A. $\frac{7}{9}$. Scales minute, cycloid. Branchiostegals five; pseudobranchiæ well developed; air-bladder large, forked anteriorly and posteriorly. Intestinal tract with several circumvolutions; five or six pyloric appendages.

Herbivorous fishes, from the Indian Seas and the Western Pacific.

The peculiarities of the *skeleton* of the fishes of this genus have been pointed out by Geoffroy St.-Hilaire and Cuvier. We have before us that of *T. virgata*. The skull is short, compressed and elevated. The crown of the head is convex, the surface of the bones showing deep striæ and series of pores, and a very distinct longitudinal suture between the two frontal bones. There is a short subtriangular occipital crest on the top of the skull, the posterior part of the skull being rather smooth. The frontals are not much narrower between the orbits than posteriorly. The præfrontals form a prominent edge of the orbit, which is minutely denticulated. Turbinals large, united on the median line; præorbital broad, the other four infraorbitals narrow. The maxillary and intermaxillary are firmly and immoveably joined together; the motions of the upper jaw are very limited, the intermaxillary having scarcely a posterior process. The lower jaw is short and broad, like the upper, similar to the bill of a parrot. The bones of the tympanic cavity are well ossified. The limbs of the præoperculum meet at a rather obtuse angle, the posterior being not twice as long as the inferior: operculum narrow, elevated, with vertical striæ; it does not extend downwards to the angle of the præoperculum, where it is replaced by the suboperculum: the suboperculum is situated along the lower limb of the præoperculum, and has a singular flap-like process at its lower margin. The pharyngeal teeth are extremely feeble; the two lower bones form together a triangular piece, on which very fine teeth are disposed in transverse series; the two bones, however, are separate and moveable.

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* 1. *Russell*, pl. 103.—Amphacanthus russelii, *Cuv. & Val.* x. p. 123.—Vizagapatam.
2. Amphacanthus firmamentum, *Cuv. & Val.* x. p. 142.—Samarang.
3. —— abhortani, *Cuv. & Val.* x. p. 143.—Ile de France.
4. —— mertensii, *Cuv. & Val.* x. p. 150.—*Hab.* ——?
5. —— rostratus, *Cuv. & Val.* x. p. 158.—Red Sea.
6. —— guamensis, *Cuv. & Val.* x. p. 163.—Guam.
7. —— olivaceus, *Cuv. & Val.* x. p. 163.—Ile de France.
8. —— kopsii, *Bleek. Riouw*, p. 483.—East Indian Archipelago.
9. —— chrysospilos, *Bleek. Singapore*, p. 66.—Singapore.
10. —— melanospilos, *Bleek. Java*, ii. p. 431.—Batavia.

The radius has a rather considerable extent, but it leaves a wide ovate free space behind the humerus; carpal bones small. The second piece of the coracoid is exceedingly long, and extends along the whole of the side of the abdomen, where it is joined to a spinous process of the first interhæmal: the abdominal cavity of these fishes is surrounded by a complete ring of bones. The pubic bones are slender, long, firmly attached to each other, without leaving a free space between them; they are fastened by a long process, which passes the symphysis of the radii and extends on to that of the humeri.

The vertebral column of all the species of *Teuthis* appears to be composed of ten abdominal and thirteen caudal *vertebræ*, the length of both portions being nearly equal. The vertebræ are somewhat elongate, not compressed. All the apophyses are strong, and those of the anterior caudal vertebræ rather long; most of them are dilated into broad transparent lamellæ posteriorly. The interneural and interhæmal of each dorsal and anal spine have a separate neural or hæmal to itself, whilst the soft rays always have two interneurals and interhæmals attached to one neural or hæmal. The first interneural and interhæmal are strong, armed anteriorly with a spine directed forwards; the whole of their structure is similar to that in *Scatophagus* (see vol. ii. p. 59). Each interneural is expanded superiorly into an oblong and slightly concave plate, which has anteriorly a notch on each side, and posteriorly a short process. The two articulatory processes of the dorsal spine belonging to the interneural are fitted into these notches, whilst the posterior process of the plate is received into a groove of the spine following, thereby allowing the erection of the latter only to the vertical line. The ribs are feeble, without epipleurals.

	lines.
Length of the first vertebra................	1
——— of the second vertebra	$1\frac{1}{3}$
——— of the third vertebra	$2\frac{1}{4}$

	lines.
Length of the sixth vertebra	$2\frac{3}{4}$
—— of the tenth vertebra	$2\frac{1}{3}$
—— of the sixteenth vertebra	2
—— of the twenty-second vertebra	$1\frac{1}{3}$
—— of the abdominal portion	$22\frac{1}{2}$
—— of the caudal portion	$23\frac{1}{2}$

Synopsis of the Species.

A. Ground-colour darker than the markings, which are in the form of whitish or bluish spots or vermiculated lines.

I. The height of the body is more than a third of the total length.

1. T. javus.
2. T. canaliculata.
3. T. concatenata.
4. T. corallina.
5. T. vermiculata.
6. T. labyrinthodes.
7. T. sutor.

II. The height of the body is one-third or less than one-third of the total length.

8. T. margaritifera.
9. T. tumifrons.
10. T. dorsalis.
11. T. oramin.
12. T. albopunctata.
13. T. striolata.

B. Ground-colour blue, with golden dots.

14. T. hexagonata.

C. Ground-colour lighter than the markings, which are in the form of brown spots or vermiculated streaks.

15. T. guttata.
16. T. stellata.
17. T. notosticta.

D. Coloration uniform or irregularly marbled, the outlines of the markings being not defined.

18. T. fuscescens.
19. T. lurida.
20. T. nebulosa.
21. T. argentea.

E. Markings darker than the ground-colour, chiefly in the form of longitudinal streaks.

22. T. marmorata.
23. T. lineata.

F. Very distinct transverse streaks.

24. T. sigana.
25. T. tetrazona.
26. T. doliata.
27. T. puella.
28. T. virgata.
29. T. vulpina.

1. **Teuthis javus.**

Teuthis javus, *L. Syst.* i. p. 507; *L. Gm.* i. p. 1362; *Cant. Catal.* p. 207.
Hepatus, *Gronov. Zooph.* p. 113. no. 352. tab. 8. fig. 4.
Russell, ii. pl. 102.
Amphacanthus javus, *Cuv. & Val.* x. p. 118; *Bleek. Verhand. Batav. Genootsch.* xxiii., *Teuth.* p. 9; *Schleg. & Müll. Verhand. Nat. Gesch. Overz. Bezitt.* p. 10.
—— russellii, *Bleek. Topogr. Batav.*

The height of the body is two-fifths of the total length; the length of the free portion of the tail is contained twice and three-fifths in that of the head. Ground-colour dark: the whitish spots are round on the back, oblong on the middle of the side, and confluent and forming longitudinal streaks on the belly; the spots and streaks are smaller and narrower than the interspaces of the ground-colour. Head without streaks; vertical fins immaculate.

East Indian Seas. Hobson Bay (Australia).

a. Adult: skin. Ceylon. Presented by Dr. E. F. Kelaart.
b–d. Adult and half-grown: skins. Pinang. From Dr. Cantor's Collection.
e. Young. Singapore.
f. Fine specimen. Amboyna. Purchased of Mr. Stevens.
g. Adult: skin. Hobson Bay. Voyage of H.M.S. Fly.
h, *i–k*. Adult and half-grown: not good state.

2. **Teuthis canaliculata.**

? Chætodon canaliculatus, *Mungo Park, Trans. Linn. Soc.* iii. p. 33; *Lacép.* iv. p. 473; *Bl. Schn.* p. 209.
Amphacanthus canaliculatus, *Bleek. Sumatra,* i. p. 580.

The height of the body is contained twice and two-thirds to twice and three-fourths in the total length. Caudal slightly emarginate. Back brownish; forehead and snout with transverse blue streaks; back and sides with numerous blue dots. (*Bleek.*)

Sumatra.

3. **Teuthis concatenata.**

Amphacanthus concatenatus, *Cuv. & Val.* x. p. 127; *Bleek. Act. Soc. Sc. Indo-Nederl.* i., *Amboina,* p. 46.
Teuthis concatenata, *Cant. Catal.* p. 208.
Skeleton: *Geoff. St.-Hil. Philos. Anat.* i. p. 471. pl. 9. fig. 107.

The height of the body is two-fifths of the total length. Caudal fin slightly emarginate. Back and sides with yellowish or reddish roundish spots, larger than, or as large as, the interspaces of the dark ground-colour; the spots become smaller towards the abdomen; head with several oblique bluish lines; the soft dorsal and anal fins with obscure dots along the rays.—Cæc. pylor. 5 (6). Vert. 10/13.

East Indian Seas.

a. Fine specimen. Amboyna. Purchased of Mr. Frank.
b. Skin. Pinang. From Dr. Cantor's Collection.
c–d. Adult and young. Singapore.

4. **Teuthis corallina.**

Amphacanthus corallinus, *Cuv. & Val.* x. p. 139; *Müll. & Schleg. Verh. Overz. Bezitt. Vissch.* p. 10. pl. 2. fig. 2; *Bleek. Verhand. Batav. Genootsch.* xxiii., *Teuth.* p. 11.

The height of the body is contained twice and three-fourths in the total length. Caudal fin deeply emarginate. Orange-coloured, with small sky-blue dots on the body and on the base of the caudal and anal fins; the dots are very small, much smaller than the interspaces between them, but larger and more crowded on the head and the thorax.

Seychelles; Molucca Sea.

a. Adult. Molucca Sea. Purchased of Mr. Frank.

5. **Teuthis vermiculata.**

Amphacanthus vermiculatus, (*Kuhl & v. Hass.*) *Cuv. & Val.* x. p. 126; *Müll. & Schleg. Verh. Overz. Bez. Vissch.* p. 11. pl. 3. fig. 2; *Bleek. Verhand. Batav. Genootsch.* xxiii., *Teuth.* p. 11.

The height of the body is contained twice and two-fifths in the total length. Brown, with vermiculated bluish lines on the head and on the whole body, except on the belly; caudal dotted all over with brown.

From Ile de France to the coasts of New Guinea.

a. Fine specimen. Amboyna. Purchased of Mr. Frank.
b. Fine specimen. Philippine Islands. Purchased of Mr. Cuming.
c. Half-grown. Old Collection.

6. **Teuthis labyrinthodes.**

Amphacanthus labyrinthodes, *Bleek. Batav.* p. 471.

The height of the body is two-fifths of the total length. Caudal fin emarginate. Red, with numerous undulated and reticulated, transverse and longitudinal, short blue lines; vertical fins immaculate. (*Bl.*)

Sea of Batavia.

7. **Teuthis sutor.**

Amphacanthus sutor, *Cuv. & Val.* x. p. 148.

The height of the body is more than one-third of the total length. Brown, minutely dotted all over with whitish. (*Val.*)

Seychelles; coast of Malabar.

8. **Teuthis margaritifera.**

Amphacanthus margaritiferus, *Cuv. & Val.* x. p. 145; *Bleek. Java*, iv. p. 334.

The height of the body is contained three times or three times and a third in the total length. Caudal fin emarginate. Ground-colour brownish-olive, dotted all over with white; no brown spot on the shoulder.

East Indian Archipelago.

a. Seventeen inches long: stuffed.—A. $\frac{7}{10}$.

9. **Teuthis tumifrons.**

Amphacanthus tumifrons, *Cuv. & Val.* x. p. 159.

The height of the body is contained thrice and a half in the total length. Caudal fin emarginate. Snout rather broad, convex. Brown, dotted all over with whitish, the dots being very small and extending on the dorsal and anal fins. (*Val.*)

Sharks Bay (W. Australia).

10. **Teuthis dorsalis.**

Amphacanthus dorsalis, *Cuv. & Val.* x. p. 143; *Müll. & Schleg. Verh. Nat. Gesch. Vissch.* pp. 10, 13. pl. 2. fig. 1.
Teuthis dorsalis, *Cant. Catal.* p. 209.

The height of the body is one-third of the total length. Caudal fin slightly emarginate. Ground-colour brownish-olive, with scattered small roundish whitish spots on the back and the sides, which are much smaller than the interspaces between; no brown spot on the shoulder.

Coasts of Pinang and Java.

a, b. Adult and half-grown: skins. Pinang. From Dr. Cantor's Collection.
c. Adult. From the Haslar Collection.

11. **Teuthis oramin.**

Amphacanthus guttatus, var. oramin, *Bl. Schn.* p. 207. tab. 48.

The height of the body is one-third of the total length. Caudal fin deeply emarginate. Back with roundish whitish spots, which become oblong on the sides, and are much smaller than the interspaces between them; caudal with black cross-bands. (*Schn.*)

Tranquebar.

This is a very doubtful species, which appears to be similar to *T. dorsalis*. The black cross-bands on the caudal fin, perhaps, have been added by Bloch.

Professor Peters has informed us that the dried typical specimen mentioned by Schneider appears to have been lost.

12. **Teuthis albopunctata.**

Amphacanthus albopunctatus, *Schleg. Faun. Japon. Poiss.* p. 128.
—— margaritiferus, *Richards. Ichth. Chin.* p. 243 (not *Cuv. & Val.*).
—— fuscescens, *Richards. Ichth. Chin.* p. 243 (not *Auct.*).
—— dorsalis, *Bleek. Verhand. Batav. Genootsch.* xxiii., *Teuth.* p. 9, and *Java,* iv. p. 332; (not *Cuv. & Val.*).
Teuthis brevirostris, *Gronov. Syst. ed. Gray,* p. 142.

The height of the body is contained three times and a half in the total length. Caudal fin emarginate. Ground-colour brownish-olive, with scattered small roundish whitish spots on the back and the sides, which are much smaller than the interspaces between. A dark-brown blotch on the shoulder, less distinct in large specimens.

East Indian Archipelago. Japanese and Chinese Seas.

a–g. Half-grown and young. Amoy.

h–l, m, n, o. Adult, half-grown, and young. China.
p, q. Adult: skins. China. Presented by J. R. Reeves, Esq.
r. Fine specimen. Philippine Islands. Purchased of Mr. Cuming.
s, t. Adult. From the Haslar Collection.
u, v. Half-grown: stuffed.
w. Adult: skin. From Gronow's Collection.
x. Half-grown: skeleton: bad state. Amoy.

The stomach is rather small, angularly bent; there are five pyloric appendages; the intestine is twice and a half as long as the entire fish, and makes several circumvolutions. The openings for the urogenital organs are separated from, and situated behind, the vent. A large portion of the abdominal cavity is between the muscles of the tail, and supported by the first interhæmal spine, which is bent forwards; the ovaria or testicles, and, between them, the elongate urinary bladder, lie immediately in the concavity of that spine. The air-bladder is simple, slightly forked anteriorly and posteriorly, with the membranes thick, and firmly attached to the dorsal side of the abdominal cavity; it receives the base of the interhæmal spine in its posterior notch: the ureters are bent downwards round the left lobe of the air-bladder, run for some distance on the left-hand side of the interhæmal spine, and finally, having entered the abdominal cavity, pass into the urinary bladder.

Vertebræ 10/13.

13. Teuthis striolata.

The height of the body is one-third, or less than one-third, of the total length. Back and sides brownish-red, with numerous vermiculated blue lines; belly bluish; the soft portions of the fins immaculate.

New Hebrides.

a, b. Stuffed. Aneiteum. From Mr. Macgillivray's Collection.

Description.—This species is similar to *T. vermiculata,* but considerably more elongate; the soft portion of the cheek, between orbit, præopercular limbs, and snout, is not higher than the orbit, and nearly twice as long as high. The length of the head is nearly one-fifth of the total, that of the caudal fin one-sixth. There are twelve teeth on each side of the upper and lower jaws. Anterior edge of the orbit scarcely denticulated. D. 13/10. A. 7/9. C. 17. P. 18. V. 1/3/1. The spines of the fins are of moderate length and strength. Caudal fin truncated when stretched out. The spinous portions of the fins are brown, each spine having some blue spots; the membranes of the soft portions are transparent, immaculate; the rays of the dorsal and anal show some indistinct brownish dots; base of the pectoral dark-coloured.

	lines.
Total length	68
Height of the body	21
Length of the head	14

	lines.
Length of the sixth dorsal spine	8
——— of the third anal spine	7½
——— of the caudal fin	11
——— of the outer ventral spine	8½

The specimens are well preserved, and the form of their body does not appear to have been altered by stuffing.

14. Teuthis hexagonata.

Amphacanthus hexagonatus, *Bleek. Kokos*, p. 41.

The height of the body is nearly one-third of the total length. Caudal fin deeply notched. Blue, with hexagonal golden dots standing densely together, covering the head, body, and the vertical fins.

Java, Sumbawa, Kokos, and Feejee Islands.

a. Adult. Feejee Islands. Voyage of the 'Herald.'

15. Teuthis guttata.

Chætodon guttatus, *Bloch*, tab. 196.
Amphacanthus guttatus, *Cuv. & Val.* x. p. 136; *Bleek. Verhand. Batav. Genootsch.* xxiii., *Teuth.* p. 10.

The height of the body is two-fifths or one-third of the total length. Caudal fin emarginate. Reddish: head clouded with reddish-grey; body, caudal, and base of the dorsal and anal fins densely spotted with reddish-brown.

East Indian Archipelago.

16. Teuthis stellata.

Scarus stellatus, *Forsk.* p. 26. no. 10.
Amphacanthus stellatus, *Bl. Schn.* p. 209; *Rüpp. N. W. Fische*, p. 129.
—— punctatus, *Rüpp. Atl. Fische*, p. 46. pl. 11. fig. 2 (not *Bl. Schn.*).
—— nuchalis, *Cuv. & Val.* x. p. 140.

The height of the body is one-third of the total length. Caudal fin forked. Greyish, covered all over with small brown spots, which are larger than the interspaces between them; a greenish-yellow spot in front of the dorsal fin.

Red Sea. Coast of Ceylon.

a, b. Adult: stuffed. Red Sea. From Dr. Rüppell's Collection.
c. Adult: skin. Ceylon. From Dr. Kelaart's Collection.

17. Teuthis notosticta.

Amphacanthus notostictus, *Richards. Ann. & Mag. Nat. Hist.* 1853, xi. p. 172.

The height of the body is rather more than one-third of the total length. Caudal fin subtruncated. Light brownish-olive (in a dried state): body with brown spots, which are smaller than the interspaces between, and confluent on the back into short, narrow, vermiculated streaks.

Port Essington.

a. Adult: skin. Coral Bay.—Type of the species.

18. Teuthis fuscescens.

Centrogaster fuscescens, *Houtt. Act. Soc. Harlem.* xx. p. 333; *Lacép.* iii. p. 307.

Amphacanthus fuscescens, *Cuv. & Val.* x. p. 156; *Schleg. Faun. Japon. Poiss.* p. 127. pl. 68. fig. 1; *Bleek. Verhand. Batav. Genootsch.* xxvi., *Japan*, p. 106.

? Amphacanthus aurantiacus, *Schleg. l. c.* p. 128 (variety?).

The height of the body is contained three times and a half in the total length. Caudal fin scarcely emarginate. Uniform brownish.

Coast of Nagasaki.

19. Teuthis lurida.

Amphacanthus luridus, (*Ehrenb.*) *Rüpp. Atl. Fische*, p. 45; *Cuv. & Val.* x. p. 150.

The height of the body is one-third of the total length. Caudal fin subtruncated; the fourth dorsal spine equals the distance of the snout from the posterior margin of the orbit. Blackish-brown, irregularly marbled with lighter.

Red Sea.

a. Adult: stuffed. Red Sea. From Dr. Rüppell's Collection.

20. Teuthis nebulosa.

? Amphacanthus punctatus, *Bl. Schn.* p. 210; *Cuv. & Val.* x. p. 146; *Forst. Descr. Anim. ed. Licht.* p. 286.

Amphacanthus nebulosus, *Quoy & Gaim. Voy. Uran. Zool.* p. 369; *Cuv. & Val.* x. p. 164; *Schleg. & Müll. l. c.* p. 12.

—— maculosus, *Quoy & Gaim. l. c.* p. 370.

—— gymnopareius, *Richards. Ann. & Mag. Nat. Hist.* 1843, xi. p. 174.

The height of the body is one-third of the total length. Caudal fin deeply emarginate. Dorsal spines slender; the length of the fourth is less than the distance of the snout from the posterior margin of the orbit. Brown, irregularly marbled with darker.

Coasts of Australia and of the islands north of it.—A drawing in the possession of Sir J. E. Tennent appears to indicate the occurrence of this species in the Sea of Ceylon.

a–d. Half-grown. Sydney. Presented by Sir J. Richardson.

e. Adult: skin. Coral Bay (Port Essington).—Type of *A. gymnopareius*.

f–k. Adult and half-grown: skins. Australia.

l–m, *n–q*. Half-grown: bad state. From the Haslar Collection.

r. Adult: stuffed.

The original drawing of Forster agrees well with our specimens of

T. nebulosa: the body is represented as purplish-brown, and there are round yellowish spots on the head and the base of the pectoral fin; these spots are wanting in the specimens mentioned, and may have been effaced by the action of the spirit. Forster, however, describes the fish as provided with "punctis gilvis numerosissimis." Whether these dots are omitted in the drawing, or whether the description is incorrect, we are unable to say without actual specimens from New Caledonia, where Forster obtained the species. In the former case the species will be distinct from *T. nebulosa*, in the latter it will probably prove to be identical with it.

21. Teuthis argentea.

Amphacanthus argenteus, *Quoy & Gaim. Voy. Uran. Zool.* p. 368. pl. 62. fig. 3; *Cuv. & Val.* x. p. 161.

The height of the body is one-fourth of the total length; caudal emarginate. Silvery: back brownish.

Marianes Islands.

a. Stuffed: not good state. Old Collection.

22. Teuthis marmorata.

Amphacanthus marmoratus, *Quoy & Gaim. Voy. Uran. Zool.* p. 367. pl. 62. fig. 1; *Cuv. & Val.* x. p. 124.
—— scaroides, *Bleek. Sumatra*, ii. p. 262.

The height of the body is one-third of the total length. Bluish, with violet streaks, which are broader than the interspaces between them, and longitudinal on the sides, whilst they are more vermiculated and reticulated on the back.

Marianes Islands. East Indian Archipelago.

a. Young. Borneo.

23. Teuthis lineata.

Amphacanthus lineatus, *Cuv. & Val.* x. p. 130. pl. 286.

The height of the body is two-fifths of the total length. Brownish (in spirits), with nine or ten brown longitudinal streaks anastomosing with one another; a yellowish spot below the soft dorsal, dotted with black and edged with red. Caudal and anal fins, and the hinder part of the tail, with brown spots. Head with some oblique bluish lines. (*Val.*)

Vanicolo and New Guinea.

24. Teuthis sigana.

Scarus siganus, *Forsk.* p. 25.
—— rivulatus, *Forsk. l. c.*
Amphacanthus siganus, *Rüpp. Atl. Fische*, p. 44. taf. 11. fig. 1, and *N. W. Fische*, p. 129; ?*Cuv. & Val.* x. p. 152.

The height of the body is one-third of the total length. Caudal

fin emarginate. Greenish, with several irregular yellowish longitudinal lines, and with brownish cross-bands extending on the dorsal fin. (*Rüpp.*)
Red Sea.

Rüppell says that the pyloric appendages are absent in this species.

25. **Teuthis tetrazona.**

Amphacanthus tetrazona, *Bleek. Celebes,* vii. p. 441.

The height of the body is contained twice and three-fifths in the total length. Caudal fin slightly emarginate. Yellow, with four pairs of undulated brownish bands across the back. (*Bl.*)
Coast of Manado.

26. **Teuthis doliata.**

Siganus doliatus, *Cuv. Règne Anim.*; *Guérin, Iconogr. Poiss.* pl. 35. fig. 1.
Amphacanthus doliatus, *Cuv. & Val.* x. p. 132; *Cuv. Règne Anim. Ill. Poiss.* pl. 71. fig. 1; *Bleek. Ternate,* ii. p. 605.

The height of the body is contained twice and two-thirds in the total length. Orange-coloured, with about thirty vertical bluish lines, the last of which are bent, and run longitudinally along the hinder part of the tail; those above the pectoral are oblique, and those on the operculum reticulated.—Cæc. pylor. 6.
Coasts of Booroo, Ternate, Vanicolo, and Timor.

27. **Teuthis puella.**

Amphacanthus puellus, *Schleg. Bydr. tot de Dierk.* 1852, p. 39. fig. 2.
Amphacanthus cyanotænia, *Bleek. Ternate,* ii. p. 606.

The height of the body is contained thrice and a fifth in the total length. Orange-coloured: the anterior portion of the sides with about six undulated blue transverse streaks, the posterior with blue longitudinal streaks, which are united with the hindmost transverse streak; a broad brown band from the neck through the eye to the the lower jaw.
East Indian Archipelago.

28. **Teuthis virgata.**

Amphacanthus virgatus, *Cuv. & Val.* x. p. 133; *Müll. & Schleg. Verh. Overz. Bez. Vissch.* p. 14. pl. 3. fig. 1; *Bleek. Verh. Batav. Genootsch.* xxiii., *Teuth.* p. 11.

The height of the body is two-fifths or three-sevenths of the total length. Body light brownish-yellow, forehead and neck with bluish transverse stripes; an oblique deep-brown, blue-edged band descends from the fourth and sixth dorsal spines to the root of the pectoral; a second similar band from the origin of the dorsal to the orbit; the space between the two bands is yellow; scattered blue dots on the upper parts of the body; some oblique bluish streaks on the snout.—Cæc. pylor. 4.

Coasts of Java and of the Philippine Islands. China.

a. Fine specimen. Philippine Islands. Purchased of Mr. Cuming.
b. Fine specimen. China. Presented by Capt. Sir E. Belcher, C.B.
c. Fine specimen. Purchased of Mr. Frank.
d. Adult. From the Haslar Collection.
e. Adult: skeleton. From the Haslar Collection.

For description of the skeleton see p. 313.

29. Teuthis vulpina.

Valent. iii. p. 354. fig. 23, and p. 387. fig. 124[*]; *Renard,* i. 4. 29.
Amphacanthus vulpinus, *Schleg. & Müll. Beschr. Zeevissch. in Verh. Nat. Gesch. Nederl. overz. Bezitt. Vissch.* p. 12, and *Bydrag. tot de Dierkunde,* v. 1852, p. 38. fig. 1; *Bleek. Ternate,* p. 135.
Teuthis tubulosa, *Gronov. Syst. ed. Gray,* p. 142.

Snout long, produced. The height of the body is contained twice and three-fourths in the total length. Yellow: head and anterior part of the body grey; a broad black band from the origin of the dorsal fin through the eye to the mouth; thorax black.

Coasts of Celebes, Ternate, Amboyna, and New Guinea.

a. Adult. Celebes. Purchased of Mr. Frank.
b. Adult: skin. From Gronow's Collection.

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[*] None of Valentyn's figures agree exactly with our specimens; there are, perhaps, several allied species or varieties.

Fam. 30. ACRONURIDÆ.

Teuthyes, part., *Cuv. Règne Anim.*; *Müll. Berl. Abhandl.* 1844, p. 201.
Acanthuroidei, *Bleek. Enum. Spec.* p. xxii.

Body compressed, oblong or elevated, covered with minute scales. Lateral line continuous; tail generally armed with one or more bony plates or spines, which are more developed with age, and frequently absent in very young individuals. Eye lateral, of moderate size. Mouth small; a single series of more or less compressed, sometimes denticulated, sometimes tapering incisors in each jaw; palate smooth. One dorsal fin, the spinous portion being the less developed; anal with two or three spines; ventral fins thoracic. Pseudobranchiæ well developed; air-bladder present, forked posteriorly. Intestines with more or less numerous circumvolutions. Vertebræ $\frac{9\ (8)}{(12)\ 13}$.

Seas between the tropics. Herbivorous fishes.

Synopsis of the Genera.

Ventral fin generally with five soft rays; a single moveable spine on each side of the tail; scales minute.	1. **Acanthurus**, p. 325.
A single moveable spine on each side of the tail; scales none; skin with vertical striæ	2. **Acronurus**, p. 345.
Ventral fin with five soft rays; a series of several keeled, bony laminæ on each side of the tail	3. **Prionurus**, p. 347.
Ventral fin with three soft rays; caudal laminæ immoveable, generally two, rarely one or three	4. **Naseus**, p. 347.
Caudal spine none (in an adult state)	5. **Keris**, p. 355.

1. ACANTHURUS[*].

Acanthurus, *Bl. Schn.* p. 211.

A single series of lobate incisors, which are sometimes moveable, in the jaws. A moveable spine in a groove on each side of the tail. Ventral fins composed of a spine and generally of five rays. One dorsal fin, the spinous portion of which is less developed than the soft; anal spines three. Scales minute, ctenoid, sometimes spiny. Branchiostegals five; pseudobranchiæ well developed; air-bladder large, forked posteriorly. Intestinal tract with several circumvolutions; five to seven pyloric appendages. Vertebræ $\frac{9\ (8)}{13}$.

Herbivorous fishes from the tropical seas.

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[*] 1. Acanthurus flavo-guttatus, *Kittl. in Mus. Senck.* i. p. 195. tab. 13. fig. 5.—A. Ketlitzii, *Cuv. & Val.* x. p. 222.—Caroline Islands. The typical specimen is in the St. Petersburg Museum.
2. —— bahianus, *Casteln. Anim. nouv. Amér. Sud, Poiss.* p. 24. pl. 11. fig. 1.—Bahia.
3. —— brevis, *Poey, Mem. Cub.* ii. p. 207.—Cuba.
4. —— tractus, *Poey, Mem. Cub.* ii. p. 208.—Cuba.

Synopsis of the Species.

I. With nine or eight (seven) dorsal spines, with broad fixed incisors, and with five soft ventral rays.

A. With black cross-bands on the head and body.

1. A. triostegus (pentazona).

B. With two white cross-bands on the anterior part of the body.

2. A. guttatus.

C. Coloration of the body nearly uniform, without conspicuous markings.

* Ground-colour brown; sometimes a whitish ring round the base of the caudal fin.

3. A. chirurgus.
4. A. matoides (lamarrii).
5. A. nigro-fuscus.
6. A. bipunctatus.
7. A. nigros.
8. A. doreensis.

* Uniform yellow.

9. A. chrysosoma.

* Some blue or red dots anteriorly.

10. A. rubropunctatus.
11. A. marginatus.

D. Body with bluish longitudinal bands or lines, or with dots disposed in longitudinal series.

12. A. lineatus.
13. A. striatus.
14. A. sohal.
15. A. undulatus.
16. A. dussumieri.
17. A. grammoptilus.
18. A. bleekeri.
19. A. cæruleus.
20. A. lineolatus.

E. A yellow or black marking on the shoulder or superiorly on the gill-opening.

21. A. olivaceus.
22. A. pyroferus.
23. A. tennentii.
24. A. gahm.
25. A. nummifer.

F. A whitish ring round the mouth or round the lower jaw.

26. A. glaucopareius.
27. A. celebicus.
28. A. fuscus.
29. A. leucosternon.
30. A. achilles.

G. Tail with a black triangle.

31. A. triangulus.

H. A blue spot below the dorsal fin.

32. A. fraterculus.

II. The soft portion of the ventral fin not fully developed.

33. A. hepatus.

III. Teeth setiform, moveable, dilated only at the extremity.

34. A. strigosus.
35. A. ctenodon.

IV. With only five to three dorsal spines.

36. A. rhombeus.
37. A. goramensis.
38. A. xanthurus.
39. A. gemmatus.
40. A. velifer.
41. A. hypselopterus.
42. A. desjardinii.
43. A. rüppellii.
44. A. suillus.

I. *With nine or eight (seven) dorsal spines, with broad fixed incisors, and with five soft ventral rays.*

A. *With black cross-bands on the head and body.*

1. **Acanthurus triostegus.**

Seba, iii. 25. 4; *Russell*, i. pl. 86.
Chætodon triostegus, *L. Syst.* i. p. 463.
Acanthurus triostegus, *Bl. Schn.* p. 215; *Cuv. & Val.* x. p. 197; *Bleek. Verhand. Batav. Genootsch.* xxiii., *Teuth.* p. 13; *Jenyns, Voy. Beagle, Fishes*, p. 75.
Harpurus fasciatus, *Forst. Descr. Anim. ed. Licht.* p. 216.
Acanthurus zebra, *Lacép.* iv. p. 546. pl. 6. fig. 3.
Chætodon zebra, *Lacép.* iii. pl. 25. fig. 3.
—— couagga, *Lacép.* iv. p. 727.
Acanthurus hirudo, *Benn. Ceyl. Fishes*, p. 11. pl. 11.
Teuthis australis, *Gray in King's Survey of the Coasts of Austr.* ii. p. 435.
Acanthurus subarmatus, *Benn. Whaling Voy.* ii. p. 278.

D. $\frac{9}{23-25}$. A. $\frac{3}{20}$. V. 1/5. Vert. 9/13.

The height of the body is one-half the total length (the caudal fin not included). The upper jaw with seven lobate incisors on each side; caudal spine small, without posterior projecting process. The upper profile of the snout is concave. Caudal fin subtruncated. Reddish-violet, with five blackish-brown transverse bands, the anterior of which passes through the orbit; another streak of the same colour along the median line of the snout; two brown spots, one above the other, on the end of the tail.

From Mauritius to Polynesia and New Zealand.

a–d, e. Fine specimens. Amboyna. Purchased of Mr. Frank.
f. Half-grown: bad state. Celebes. Purchased of Mr. Frank.
g, h. Adult: bad state. Malayan Archipelago. Presented by Sir J. Richardson.
i. Adult: skin: bad state. Sandwich Islands.
k. Fine specimen. Aneiteum. From Mr. Macgillivray's Collection.
l. Adult. West coast of Australia. From Captain King's Collection. —Type of *Teuthis australis*, Gray.
m, n, o, p, q. Adult and half-grown.
r. Adult: stuffed.
s. Adult: skeleton. From the Collection of the Zoological Society.

Skeleton.—The skull has a very peculiar physiognomy, from the shortness of its cranial portion and the elongation of its front part, in which, however, the jaw-bones do not participate. In general form it is somewhat compressed, elevated, triangular. The crown of the head is very short and convex, with the occipital crest moderately developed; the interorbital space is broad and flat. The frontal bones and the præorbital are prolonged, the bones situated before them being very short. Turbinals well developed, united on the median line. The jaws are formed as in *Teuthis*: the maxillary and intermaxillary are firmly and immoveably joined together, and the latter has its posterior processes extremely short. The lower jaw is broad and very short. Palatines very short; all the bones of the tympanic cavity are well ossified, and of rather large size; the epitympanic especially is well developed, occupying the whole of the anterior side of the præoperculum. The præorbital is very elongate; the other bones of the infraorbital ring are firmly united together, and the posterior ones are in immediate contact with the inner ridge of the præoperculum, as in *Chætodon.* The angle formed by the limbs of the præoperculum is very obtuse; the lower limb has only half the length of the posterior: operculum rather narrow and elevated, not extending downwards to the angle of the præoperculum, where it is replaced by the suboperculum: interoperculum small.

The bones of the humeral arch are rather strong: the suprascapula is firmly united with the skull; scapula long, broader in its inferior half than in its superior; coracoid very long and strong, straight. The cavity for the pectoral muscles, which is formed by the humerus and the bones of the fore-arm, is very broad and rather deep; its bottom is nearly entirely osseous, the ulna having a small foramen, the radius a larger and a smaller one. The pubic bones are very long, slightly bent, and firmly attached to each other, leaving scarcely any free space between them.

There are nine abdominal and thirteen caudal *vertebræ*, the length of the former portion of the vertebral column being to that of the caudal as 1 : 1·66. The vertebræ are somewhat elongate, not compressed. All the apophyses are strong, and those of the anterior caudal vertebræ rather long. The neurals and interneurals of the abdominal vertebræ are so dilated into lamellæ posteriorly, that the whole forms one continuous osseous plane, without free spaces between the single bones. The first interneural is exceedingly strong and compressed; it is dilated superiorly, the dilated portion ending in a spine anteriorly, behind which is a deep incisure to receive the base of the first dorsal spine. The second interneural is firmly attached to the first. The interneurals of the following dorsal spines are dilated superiorly into a slightly concave plate, as in *Teuthis*, and one always corresponds to a single neural, whilst each neural and hæmal of the caudal vertebræ always support two interneurals and interhæmals of the soft rays. The first interhæmal is similar in structure to the first interneural, but much longer, and its dilated portion has no spine anteriorly. Ribs well developed, with epipleurals.

	lines.
Length of the first vertebra	$0\frac{2}{3}$
——— of the second vertebra	$1\frac{1}{4}$
——— of the third vertebra	$1\frac{1}{3}$
——— of the fourth vertebra	$2\frac{1}{4}$
——— of the tenth vertebra	$2\frac{1}{2}$
——— of the twentieth vertebra	2
——— of the abdominal portion	19
——— of the caudal portion	$31\frac{1}{2}$
——— of the eleventh neural spine	11
——— of the first hæmal spine	14
——— of the first interneural spine	7
——— of the first interhæmal spine	19

Dr. v. Bleeker describes another species, which is probably an individual variety of *A. triostegus*; the single specimen which occurred was 29 millimetres long.

Acanthurus pentazona, Bleek. Verhand. Batav. Genootsch. xxiii., Teuth. p. 13, and Java, i. p. 107.

D. $\frac{9}{20}$. A. $\frac{3}{20}$.

The height of the body is one-half the total length (the caudal fin included). Caudal spine small. The upper profile of the snout is convex; caudal fin truncated. Yellowish, with five blackish transverse bands, the anterior of which passes through the eye.

Sea of Batavia.

B. *With two white cross-bands on the anterior part of the body.*

2. Acanthurus guttatus.

Harpurus guttatus, *Forst. Descr. Anim. ed. Licht.* p. 218.
Acanthurus guttatus, *Bl. Schn.* p. 215; *Cuv. & Val.* x. p. 195.
Chætodon stellatus, *L. Gm.* i. p. 1269.

D. $\frac{9}{27-28}$. A. $\frac{3}{24}$. V. 1/5.

Scales very small, smooth. The height of the body is two-thirds of the total length (the caudal fin not included). The upper jaw with six truncated and deeply lobate incisors on each side. Caudal spine terminating posteriorly in a projecting process. The upper profile of the snout is subvertical and very slightly concave. Caudal fin subtruncated. Brownish, with two whitish cross-bands: one from the nape of the neck over the operculum, the other from the fifth and six dorsal spines to the belly. Posterior half of the body, dorsal and anal fins with numerous round white spots.

Otaheiti. New Hebrides. Mauritius.

a. Adult: bleached. Otaheiti. From Forster's Collection.—Type of the species.
b. Adult: stuffed. Aneiteum. From Mr. Macgillivray's Collection.
c. Adult. Mauritius. From the Collection of the Zoological Society.
d. Adult: stuffed. Mauritius.

C. *Coloration of the body nearly uniform, without conspicuous markings.*
* *Ground-colour brown: sometimes a whitish ring round the base of the caudal fin.*

3. Acanthurus chirurgus.

Acarauna, *Marcgr.* p. 144.
Barbero, *Parra*, lam. 21. fig. 2.
Hepatus, *Gronov. Zoophyl.* no. 353.
Chætodon nigricans, *Bl.* iii. p. 82. t. 203; (not *L.*).
—— chirurgus, *Bl.* t. 208.
Acanthurus nigricans, pt., *Bl. Schn.* p. 211.
—— chirurgus, *Bl. Schn.* p. 214; *Cuv. & Val.* x. p. 168; *Guichen. in Ramon de la Sagra, Cuba, Poiss.* p. 120; *Casteln. Anim. nouv. Amér. Sud, Poiss.* p. 24.

Acanthurus phlebotomus, *Cuv. & Val.* x. p. 176. pl. 287; *Casteln. l. c.* p. 25; *Dekay, New York Fauna, Fishes,* p. 139. pl. 73. fig. 234.
Acronurus fuscus, *Gronov. Syst. ed. Gray,* p. 191.

D. $\frac{9}{23-26}$. A. $\frac{3}{22-23}$. V. 1/5. Cæc. pylor. 5.

The height of the body is one-half or rather less than one-half the total length (the caudal fin not included). The distance of the nostril from the edge of the upper jaw is two-thirds of the length of the head. The upper jaw with seven or eight lobate incisors on each side. Caudal spine with a process posteriorly, pointing backwards. The upper profile of the snout straight. Brownish: operculum with black margin; sometimes a whitish band across the end of the tail, which, if present, occupies more of the scaly portion of the tail than of the caudal fin. Other markings are rather inconstant: indistinct darker transverse streaks; undulated longitudinal lines in immature specimens; blackish longitudinal streaks on the dorsal and anal fins; a narrow whitish posterior edge of the caudal fin.

Atlantic coasts of Tropical America and Africa.

a–o. Adults, half-grown, and young: skins. Caribbean Sea. From Dr. Parnell's and Mr. Scrivener's Collections.
p–s. Half-grown and young. West Indies. Purchased of Mr. Scrivener.
t. Adult. Puerto Cabello. Purchased of Mr. Brandt.
u. Half-grown: stuffed. Bahia.
v. Nineteen inches long: stuffed.
w, x. Adult. From the Haslar Collection.
y. Half-grown: skin. From Gronow's Collection.

4. Acanthurus matoides.

Acanthurus nigricans, pt., *Bl. Schn.* p. 211.
? Acanthurus fuliginosus, *Less. Voy. Coq. Zool.* p. 149. pl. 27. fig. 2.
? Acanthurus rasi, *Cuv. & Val.* x. p. 203.
Acanthurus matoides, *Cuv. & Val.* x. p. 204; *Bleek. Verhand. Batav. Genootsch.* xxiii., *Teuth.* p. 12.
—— annularis, *Cuv. & Val.* x. p. 209 (immature specimens with a whitish caudal ring).
—— blochii, *Cuv. & Val.* x. p. 209 (immature specimens without a whitish caudal ring).
? Acanthurus xanthopterus, *Cuv. & Val.* x. p. 215; *Cuv. Règne Anim. Ill. Poiss.* pl. 71. fig. 2.
Acanthurus xanthopterus, *Cant. Catal.* p. 209. pl. 4.
Skeleton: *Agass. Poiss. Foss.* iv. p. 206. tab. F. (A. xanthopterus).

D. $\frac{9}{27-28}$. A. $\frac{3}{25-28}$. V. 1/5. Vert. 9/13.

The height of the body is one-half or somewhat more than one-half the total length (the caudal fin not included). The distance of the nostril from the edge of the upper jaw is two-thirds of the length of the head. The upper jaw with seven or eight lobate incisors on each side. Caudal spine with a process posteriorly, pointing backwards. The upper profile of the snout is nearly straight in immature specimens, convex in adult ones. Brown: generally with a whitish band across the root of the caudal fin, which, if present, occupies more space on the fin than on the scaly portion of the tail; it disappears entirely in old individuals. Dorsal and anal fins with dark-blue longitudinal streaks.

East Indian Seas. Polynesia.

a–b, c. Half-grown and young. Amboyna. Purchased of Mr. Frank.
d. Half-grown: skin. Pinang. From Dr. Cantor's Collection.
e. Young. Feejee Islands.
f. Adult. From the Haslar Collection.
g, h. Adult: skins. From the Collection of the Zoological Society.

The earlier ichthyologists have confounded this species with the *A. chirurgus* from the Atlantic, in consequence of the close affinity existing between them. This affinity is so great, that we are much inclined to consider them as mere varieties. Yet we have not seen a specimen of the Atlantic form which has the profile of the snout so convex as it may be seen in *old* Indian fishes. Valenciennes has entirely overlooked the changes in the form of the caudal fin and of the snout, and of colour, to which this species is subject with age, and has invented specific names for every stage of development.

Acanthurus lamarrii, Cuv. & Val. x. p. 236, also appears to be very closely allied to *A. matoides,* but is said to have only twenty-three soft rays in the anal fin.

5. **Acanthurus nigro-fuscus.**

Chætodon nigrofuscus, *Forsk.* p. 64.
Mata, *Russell,* i. p. 64. pl. 82.
? Chætodon elongatus, *Lacép.* iv. p. 471. pl. 6. fig. 2.
Acanthurus nigricans, *Rüpp. Atl. Fische,* p. 57.
? Acanthurus mata, *Cuv. & Val.* x. p. 202.
? —— nigro-fuscus, *Cuv. & Val.* x. p. 214.
? —— elongatus, *Cuv. & Val.* x. p. 206.

D. $\frac{9}{24\text{–}27}$. A. $\frac{3}{23\text{–}25}$. V. 1/5. Vert. 9/14.

The height of the body is one-half the total length (the caudal fin not included). The distance of the nostril from the edge of the upper jaw is rather less than one-half the length of the head. The upper jaw with eight or nine lobate incisors on each side. Caudal spine with a process posteriorly, pointing backwards. The upper profile of the snout nearly straight. Uniform blackish-brown.

Red Sea. Ceylon. Coast of Coromandel. Amboyna.

a. Adult: skin. Ceylon. From Dr. Kelaart's Collection.
b, c. Half-grown and young. Amboyna. Purchased of Mr. Frank.

6. **Acanthurus bipunctatus.**

D. $\frac{9}{25}$. A. $\frac{3}{24}$.

The greatest depth of the body is between the ventral and anal spines, and one-half the total length (the caudal fin not included). The profile between the origin of the dorsal fin and the nostril is convex, that of the snout rather concave. There are five broad incisors on each side of the upper jaw, and six in the lower; the latter are truncated, and denticulated only at the cutting margin. Dorsal and anal fins rounded posteriorly in adult, pointed in young specimens. Caudal emarginate (forked in young specimens). Uniform blackish or brown; a black spot posteriorly in the axil of the dorsal and anal fins.

Sea of China. Feejee Islands.

a. Six inches and a half long. China.
b. Thirty-eight lines long. Feejee Islands. Voyage of the 'Herald.'

7. **Acanthurus nigros.**

? Acanthurus nigroris, *Cuv. & Val.* x. p. 208.

D. $\frac{9}{25-27}$. A. $\frac{3}{23-25}$.

The height of the body is one-half or more than one-half of the total length (the caudal fin not included). The profile between the origin of the dorsal fin and the nostril is convex, that of the snout very slightly concave. There are six incisors on each side of the upper jaw, and seven in the lower; all are serrated only at the cutting margin. Uniform brown: vertical fins and lips black; a black spot posteriorly in the axil of the dorsal and anal fins.

(? Sandwich Islands.) New Hebrides.

a–c. Adult, half-grown, and young: stuffed. Aneiteum. From Mr. Macgillivray's Collection.

8. **Acanthurus doreensis.**

Cuv. & Val. x. p. 220.

D. $\frac{9}{28}$. A. $\frac{3}{20}$.

Profile of the snout concave. Brown: the posterior half of the pectoral is yellowish; caudal with a whitish edge. (*Val.*)

Dorey Harbour (New Guinea).

* *Uniform yellow.*

9. **Acanthurus chrysosoma.**

Bleeker, Boeroe, ii. p. 67.

D. $\frac{9}{24}$. A. $\frac{3}{24}$.

The height of the body is rather more than one-third of the total length (the caudal fin included). The profile of the snout is slightly concave; six lobate incisors on each side of the upper jaw. Uniform yellow; vertical fins slightly edged with brown. (*Bl.*)

Sea of Kajeli.

* *Some blue or red dots anteriorly.*

10. Acanthurus rubropunctatus.

Rüpp. Atl. Fische, p. 59.

D. $\frac{9}{20}$. A. $\frac{3}{22}$.

The height of the body is more than one-half of the length (the caudal fin not included); anterior profile of the snout subvertical, slightly concave. Blackish-brown; head and thorax dotted with red. (*Rüpp.*)

Northern parts of the Red Sea.

11. Acanthurus marginatus.

Acanthurus guttatus, *Kittl. in Mus. Senck.* i. p. 194. taf. 13. fig. 4; (not *Bl. Schn.*).
—— marginatus, *Cuv. & Val.* x. p. 221.

D. $\frac{9}{26}$. A. $\frac{3}{23}$.

The height of the body is one-half of the length (the caudal fin not included). The snout is somewhat produced, with the upper profile concave. Reddish-brown: head and anterior half of the body with scattered blue dots; vertical fins blackish, dorsal and anal fins blue-edged.

Island of Luganor.

D. *Body with bluish longitudinal bands or lines, or with dots disposed in longitudinal series.*

12. Acanthurus lineatus.

Valent. iii. p. 360. fig. 47, p. 424. fig. 257; *Renard,* i. 7. 54, i. 13. 80; *Seba,* iii. 25. 1 (? 26. 37).
Chætodon, no. 1, *Artedi, Spec.* p. 89.
—— lineatus, *L. Syst. Nat.* 13th edit. i. p. 1246.
Acanthurus lineatus, *Bl. Schn.* p. 214. tab. 49; *Lacép.* iv. pp. 547, 549; *Cuv. & Val.* x. p. 223; *Bleek. Sumatra,* ii. p. 263.
—— vittatus, *Benn. Fish. Ceyl.* p. 2. pl. 2.

D. $\frac{9}{28}$. A. $\frac{3}{27}$. Vert. 9/13.

The height of the body is one-half of the length (the caudal fin not included); anterior profile of the snout subvertical, slightly convex; upper jaw with six lobate incisors on each side. Ground-colour of the back and sides yellow, of the belly whitish. Nine slightly oblique blue lines run from the head to the back and the root of the caudal fin; each of them has a brown band on each side, which is as broad as the stripes of the yellow ground-colour. Two similar curved blue, brown-edged stripes from the eye round the cheek to the base of the pectoral. Caudal brown, whitish posteriorly, both colours being separated by a curved blue line; two or three vertical lines at the base of the fin.

East Indian Archipelago; Western parts of Polynesia.

a. Adult. Malay Archipelago. Presented by Sir J. Richardson.

b, c, d. Adult and young. Amboyna. Purchased of Mr. Frank.
e. Young. Philippine Islands. From Mr. Cuming's Collection.
f. Adult: skeleton. Malay Archipelago. From the Haslar Collection.

The *skeleton* differs very slightly from that of *A. triostegus*; the apophyses of the vertebræ are rather more feeble, and three or even four of the *posterior* interneurals and interhæmals correspond to one neural or hæmal. The last two caudal vertebræ have a prominent ridge, which serves as the base for the external caudal spine.

	lines.
Length of the first vertebra	$0\frac{1}{3}$
——— of the second vertebra	$1\frac{1}{3}$
——— of the fourth vertebra	$1\frac{3}{4}$
——— of the tenth vertebra	$2\frac{2}{3}$
——— of the sixteenth vertebra	3
——— of the twentieth vertebra	$2\frac{1}{4}$
——— of the twenty-first vertebra	$1\frac{2}{3}$
——— of the abdominal portion	16
——— of the caudal portion	33
——— of the twelfth neural spine	$10\frac{1}{2}$
——— of the first hæmal spine	15
——— of the first interneural spine	7
——— of the first interhæmal spine	$12\frac{1}{2}$

13. Acanthurus striatus.

Quoy & Gaim. Voy. Uran. Zool. p. 373, *Poiss.* pl. 63. fig. 3 (bad); *Cuv. & Val.* x. p. 229.

D. $\frac{9}{26}$.

The height of the body is one-half of the total length (the caudal fin not included). Profile of the snout not concave. Brown, with eleven or twelve straight bluish longitudinal streaks.

Marianes.

The specimens described are only $2\frac{1}{2}$ inches long. The following appears to belong to this species:—

a. $1\frac{2}{3}$ inches long. Borneo.

14. Acanthurus sohal.

Chætodon sohal, *Forsk.* p. 63.
Acanthurus sohal, *Bl. Schn.* p. 215; *Rüpp. Atl. Fische,* p. 56. taf. 16. fig. 1; *Cuv. & Val.* x. p. 227.
—— carinatus, *Bl. Schn.* p. 216.
Aspisurus sohar, *Lacép.* iv. pp. 556, 557.

D. $\frac{8}{31}$. A. $\frac{3}{28\text{–}29}$. Cæc. pylor. 5. Vert. 9/14.

The height of the body is less than one-half of the total length (the caudal fin not included). The anterior profile of the snout is convex. Greyish-violet, with about fourteen bluish longitudinal streaks along the side, separated by black interspaces; vertical fins black, edged with blue.

Northern parts of the Red Sea.

a. Adult. Red Sea. From Dr. Rüppell's Collection.

15. Acanthurus undulatus.

Cuv. & Val. x. p. 205.

D. $\frac{9}{26}$. A. $\frac{3}{24}$.

The height of the body is rather more than one-half of the total length (the caudal fin included). Profile of the snout nearly straight. Light brown, with twelve or thirteen undulated whitish lines, ascending posteriorly; dorsal and anal fins brownish. (*Val.*)

Indian Ocean.

16. Acanthurus dussumieri.

Cuv. & Val. x. p. 201.

D. $\frac{9}{26}$. A. $\frac{3}{24}$.

The height of the body is rather less than one-half of the total length; the anterior profile of the snout is slightly convex; the length of the head is contained twice and two-thirds in its height. Caudal fin slightly emarginate. Dark brown, with very numerous, fine, rather irregular bluish longitudinal lines, and with some spots of the same colour on the thorax and the caudal fin; base of the dorsal fin with bluish and reddish longitudinal streaks; a rose-coloured band between the eyes. (*Val.*)

Mauritius.

17. Acanthurus grammoptilus.

Richards. in Ann. & Mag. Nat. Hist. 1842, xi. p. 176.

D. $\frac{9}{26}$. A. $\frac{3}{24}$.

The height of the body is two-sevenths of the total length (the caudal fin not included). The profile of the snout is rather convex. Nine lobate teeth on each side of the upper jaw. Brown (in a dried state), with very numerous undulated and irregular bluish longitudinal lines; a whitish band across the basal portion of the caudal fin; posterior half of the pectoral yellowish; dorsal fin with five dark longitudinal lines; anal with a light line, along and within the margin; dorsal and anal fins with a black spot posteriorly in the axil.

Port Essington.

a, *b*. Skins. Types of the species.

18. Acanthurus bleekeri.

Acanthurus mata, *Bleek. Java*, ii. p. 432; (not *Cuv. & Val.*).

D. $\frac{9}{25}$. A. $\frac{3}{23}$.

The height of the body is nearly one-third of the total length (the caudal fin included). The profile of the snout is somewhat convex. Nine lobate teeth on each side of the upper jaw. Brownish-red, with more than thirty blue longitudinal lines; cheek with seven or eight blue longitudinal bands, the upper of which are united with those of the other side of the head; dorsal and anal fins violet, with five or seven orange-coloured bands, and with a black spot posteriorly in the axil: caudal brown, darker towards the margin. (*Bleek.*)

East Indian Archipelago.

19. **Acanthurus cæruleus.**

Seba, iii. 25. 2.
Turdus rhomboidalis, *Catesb.* ii. pl. 10. fig. 1.
Chætodon nigrescens, *Artedi, Spec.* p. 90.
—— nigricans, *L. Syst. Nat.* i. p. 462.
Acanthurus cæruleus, *Bl. Schn.* p. 214; *Cuv. & Val.* x. p. 179; *Guichen. in Ramon de la Sagra, Cuba, Poiss.* p. 121; *Casteln. Anim. nouv. ou rares de l'Amér. Sud, Poiss.* p. 25. pl. 12. fig. 2.

D. $\frac{9}{27-28}$. A. $\frac{3}{25}$. V. 1/5. Cæc. pylor. 5. Vert. 8/13.

The height of the body is two-thirds of the total length (caudal not included). The upper jaw with six lobate incisors on each side. Caudal spine with a process posteriorly, pointing backwards. The upper profile of the snout concave. Caudal fin more or less emarginate. Brownish, with bluish longitudinal lines, undulated on the body, straight and rather oblique on the dorsal and anal fins.

Atlantic coasts of Tropical America.

a–f. Adult: skins. Caribbean Sea. From Dr. Parnell's Collection
g–h. Adult. West Indies. Purchased of Mr. Scrivener.
i–k. Adult: stuffed. Bahia.

20. **Acanthurus lineolatus.**

Cuv. & Val. x. p. 207; *Bleek. Banda,* iii. p. 101.

D. $\frac{9}{25}$. A. $\frac{3}{24}$.

The height of the body is nearly one-third of the total length (the caudal fin included). The profile of the snout is convex. Six lobate teeth on each side of the upper jaw. Caudal fin subtruncated, with the angles produced. its length being contained thrice and a third in the total length. Brown, dotted with blue, the dots being disposed in longitudinal series: dorsal and anal fins with black margins, and with a black spot posteriorly in the axil; caudal black- and yellow-edged.

Coasts of Banda and Amboyna.

E. *A yellow or black marking on the shoulder or superiorly on the gill-opening.*

21. **Acanthurus olivaceus.**

Valent. iii. p. 409. fig. 199; *Renard,* ii. 12. 55.
Acanthurus olivaceus, *Bl. Schn.* p. 213; *Kittlitz in Mus. Senckenb.* i. p. 192. tab. 12. fig. 1.

Harpurus paroticus, *Forst. Descr. Anim. ed. Licht.* p. 183.
Acanthurus eparai, *Less. Voy. Coq. Zool.* ii. p. 147, *Poiss.* pl. 27. fig. 1.
—— humeralis, *Cuv. & Val.* x. p. 231; *Bleek. Celeb.* iii. p. 762; *Eyd. & Soul. Voy. Bonite, Zool.* i. p. 169; *Jenyns, Voy. Beagle, Fishes,* p. 76.

D. $\frac{9}{25}$. A. $\frac{3}{24}$. Cæc. pylor. 6.

The height of the body is one-half or rather less than one-half of the total length (the caudal fin not included). The anterior profile of the snout more or less convex. There are eight lobate incisors on each side of the upper jaw. Caudal spine with a process posteriorly, pointing backwards. Brownish-olive: an elongate orange-coloured, black-edged spot on the trunk, extending from the operculum to beyond the end of the pectoral fin. Caudal fin with a white posterior margin, and, in immature individuals, with a whitish band across the base; dorsal and anal fins with an orange-coloured line along the base.

Polynesia. Celebes. Amboyna. Goram.

a. Adult. Otaheiti. From Forster's Collection.—Type of the species.
b. Half-grown. Feejee Islands. Voyage of the 'Herald.'

22. **Acanthurus pyroferus.**

Acanthurus pyroferus, *Kittl. in Mus. Senckenb.* i. p. 193. taf. 12. fig. 2.
—— armiger, *Cuv. & Val.* x. p. 234.

D. $\frac{?}{29}$. A. $\frac{3}{25}$.

The height of the body is one-half of the length (the caudal fin not included). Snout rather produced, with the upper profile concave. Dark brown: shoulder with an oblong vertical yellow spot, edged with black; caudal with a broad yellow posterior margin. (*Kittl.*)

Coast of Ulea.

The typical specimen is in the St. Petersburg Museum.

23. **Acanthurus tennentii.**

D. $\frac{9}{23}$. A. $\frac{3}{22}$. V. 1/5.

The height of the body is one-half of the total length (the caudal fin not included). The anterior profile of the snout is nearly straight. There are six lobate incisors on each side of the upper jaw, and eight on each side of the lower. The dorsal spines are moderately stout, increasing in length posteriorly, the hindmost being one-third of the depth of the body. Dorsal and anal fins rounded posteriorly; caudal slightly emarginate. Scales minute. The caudal spine of moderate length and strength, with a process posteriorly, pointing backwards. Brown (in a dried state): a roundish black ring on the shoulder, apparently with light centre; caudal with a broad white margin.

Sea of Ceylon.

a. Skin. From Dr. Kelaart's Collection.

	lines.
Total length	60
Height of the body	23
Length of the head	13
——— of the caudal fin	11
——— of the last dorsal spine	8

24. Acanthurus gahm.

Chætodon gahhm, *Forsk.* p. 64.
Acanthurus gahm, *Cuv. & Val.* x. p. 219; *Rüpp. Atl. Fische,* p. 58, and *N. W. Fische,* p. 131; *Bleek. Act. Soc. Sc. Indo-Nederl.* iii., *Celebes,* p. 8.

D. $\frac{9}{27}$. A. $\frac{3}{25}$.

The height of the body is one-third or rather less than one-third of the total length (the caudal fin included), the length of the head one-sixth; there are sixteen or twenty teeth in each of the jaws, denticulated on the free half. The profile of the snout is convex. The height of the dorsal and anal fins is about one-third of that of the body; the length of the pectoral is one-fifth of the total, that of the ventral one-sixth; caudal with the middle somewhat convex, and with the lobes much produced, the latter being two-sevenths of the total length. Brown: a whitish spot before the orbit; the suprascapular region orange-coloured, with a black streak from the opercle to above the middle of the pectoral fin; another black band from the caudal spine to above the middle of the anal. A white band across the base of the caudal, which has a white margin, and another blackish band within the margin. Pectoral whitish at the base, brownish on the middle, and yellowish at the margin.

Red Sea. Mauritius. Celebes.

25. Acanthurus nummifer.

Acanthurus bariene, *Less. Voy. Coq. Zool.* p. 150.
—— nummifer, *Cuv. & Val.* x. p. 234.

D. $\frac{9}{27}$. A. $\frac{3}{26}$.

The height of the body is more than one-half of the length (the caudal fin not included); the upper profile of the head arched, and prominent beyond the mouth, which is entirely situated at the lower side of the head. Head covered entirely with scales, which are much smaller than those on the body; mouth and shoulder naked; sixteen to twenty crenulated teeth in each of the jaws; ventral fins produced into a point; the first spine of the dorsal fin is entirely hidden below the skin. Dark brown, with a round bluish-black spot superiorly at the gill-opening; sheath of the caudal spine black. A light-blue line along the base of the dorsal and anal fins; the margin of the dorsal with two or three violet lines; anal blue-edged. (*Val.*)

Waigiou.

The typical specimen is one foot long.

F. *A whitish ring round the mouth or round the lower jaw.*

26. Acanthurus glaucopareius.

Valent. iii. p. 466. fig. 383, p. 476. fig. 410; *Renard,* i. 9. 63; *Ruysch, Theatr.* p. 23. tab. 12. fig. 10, & p. 40. pl. 20. fig. 14; *Seba,* iii. 25. 3.
Harpurus nigricans, *Forst. Descr. Anim. cur. Licht.* p. 214 (*Bl. Schn.* p. 212).
Acanthurus aliala, *Less. Voy. Coq. Zool.* ii. p. 150.
—— glaucopareius, *Cuv. & Val.* x. p. 190; *Kittlitz in Mus. Senckenb.* i. p. 192. tab. 13. fig. 3; *Bleek. Act. Soc. Sc. Indo-Nederl.* i., *Amboina,* p. 47.

$D. \frac{9}{30}$. $A. \frac{3}{28}$. V. 1/5. Cæc. pylor. 5.

Scales very small, smooth. The height of the body is contained once and two-thirds in the total length (the caudal fin not included). The upper jaw with five truncated and lobate teeth on each side. Caudal spine terminating posteriorly in a projecting process. The upper profile of the snout is subvertical, very slightly concave. Caudal fin emarginate. Blackish-violet: a white subcrescentic spot below the orbit; a white ring encircling the mouth; a whitish line running along the base of the dorsal and anal fins, and widening posteriorly; caudal fine light violet, with a yellowish cross-band.

Polynesia. Amboyna.

a. Fine specimen. Amboyna. Purchased of Mr. Frank.
b. Adult. Otaheiti. From Forster's Collection.—Type of the species.

27. Acanthurus celebicus.

Bleeker, Celebes, iii. p. 761.

$D. \frac{8-9}{26-25}$. $A. \frac{3}{24}$.

The height of the body is nearly one-third of the total length (the caudal fin included). The profile of the snout is concave. Eight lobate teeth on each side of the upper jaw. Caudal and ventral lobes pointed. Brown: mouth with a white ring and with black lips; fins dark brown; caudal blackish, with a white margin. (*Bl.*)

Seas of Macassar and of Ternate.

28. Acanthurus fuscus.

Steindachner in Verhandl. Zool. Bot. Gesellsch. Wien, 1861, p. 176. taf. 5.

$D. \frac{7}{29}$. $A. \frac{3}{26}$.

The height of the body is rather more than one-half of the total length, without caudal, or one-third with the caudal. The profile of the snout is concave. Seven lobate teeth on each side of the upper jaw. Caudal and ventral lobes produced into filaments. Brown: mouth with a white ring and with black lips; vertical and ventral fins black; the caudal blackish towards the margin.

Amboyna.

This fish is probably identical with *A. celebicus,* Bleek., the specimen in the Vienna Museum being apparently an adult fish, with the appendages of the fins fully developed.

29. Acanthurus leucosternon.

Acanthurus leucosternon, *Benn. Proc. Zool. Soc.* 1832, p. 183; *Bleek. Batoe*, iii. p. 237.
—— delisianus, *Cuv. & Val.* x. p. 193; *Guér. Iconogr. Poiss.* pl. 35. fig. 2.

D. $\frac{9}{29-30}$. A. $\frac{3}{27-28}$. V. 1/5.

Scales very small, smooth. The height of the body is contained once and four-fifths in the total length (the caudal fin not included). The upper jaw with five truncated and lobate teeth on each side. Caudal spine terminating posteriorly in a projecting process. The upper profile of the snout is subvertical and slightly concave. Caudal fin emarginate. Blue: head black; chest, and a ring encircling the lower part of the mouth, white; dorsal fin yellow; caudal with two black crescents, one across the base, the other along the margin, both united by the upper and lower black edges of the fin.

Mauritius. Ceylon. Batoe.

a. Fine specimen. Ceylon. From Mr. Sibbald's Collection.—Type of the species.

30. Acanthurus achilles.

Shaw, Zool. iv. p. 383; ? *Cuv. & Val.* x. p. 218.

D. $\frac{9}{32}$. A. $\frac{2}{28}$. V. 1/5. Vert. 9/13.

A large rhombic, naked, yellowish patch on the tail, including the caudal spine. Anterior profile of the snout subvertical, nearly straight. Four truncate and lobate teeth on each side of the upper jaw. Brown: patch on the tail yellowish; a narrow bluish line along the base of the dorsal and anal fins; a bluish ring across the chin, from one angle of the mouth to the other; subopercular margin and outer half of the ventrals bluish. Caudal fin with the base deep brown, lighter across the middle; a narrow brown crescent between the light centre of the fin and the broad white margin.

Sea of China.

a–b, c, d, e, f. Fine specimens. China.
g. Adult: skeleton. China. From the Haslar Collection.

Valenciennes gives as the formula of the fins, D. $\frac{9}{25}$, A. $\frac{3}{23}$; but he examined only a single dry specimen.

The *skeleton* differs so little from that of *A. triostegus*, that it will be sufficient merely to give the measurements of some of its parts.

	lines.
Length of the first vertebra	$0\frac{1}{3}$
——— of the second vertebra	1
——— of the tenth vertebra	2
——— of the twentieth vertebra	$1\frac{1}{2}$
——— of the twenty-first vertebra	$0\frac{3}{4}$
——— of the abdominal portion	14
——— of the caudal portion	24
——— of the twelfth neural	9
——— of the first hæmal	12
——— of the first interneural	$6\frac{1}{3}$
——— of the first interhæmal	15

G. *Tail with a black triangle.*

31. Acanthurus triangulus.

Cuv. & Val. x. p. 189.

Tail with a black triangle, whilst its borders are yellow, which colour extends over the whole upper part of the back nearly to the eye. One-half of the pectoral black; operculum with a yellow band.

This species is described by Valenciennes from an old drawing of Vlaming, and has not been recognized.

H. *A blue spot below the dorsal fin.*

32. Acanthurus fraterculus.

Renard, ii. no. 47; *Valent.* no. 413.
Acanthurus fraterculus, *Cuv. & Val.* x. p. 206.

Body oblong, anterior profile convex. Caudal fin emarginate; the dorsal and anal fins are low anteriorly, elevated and pointed posteriorly. Brown, with three oblique blue and red bands on the side of the head, two of which descend to the eye, and the third to the mouth; a blue spot below the middle of the dorsal fin; base of the caudal spine black.

East Indies.

This species, figured by Renard, has not been recognized.

II. *The soft portion of the ventral fin not fully developed.*

33. Acanthurus hepatus.

Valent. iii. p. 473. fig. 404, & p. 472. fig. 402; *Seba*, iii. 33. 3.
Teuthis hepatus, *L. Syst. Nat.* i. p. 507; *L. Gm. Syst. Nat.* i. p. 1362.
Acanthurus hepatus, *Bl. Schn.* p. 211; *Cuv. & Val.* x. p. 183. pl. 288; *Bleek. Floris*, p. 325.
—— theuthis, *Lacép.* iv. pp. 549, 553.

D. $\frac{9}{19-20}$. A. $\frac{3}{18-19}$. V. 1/3. Vert. 8/14.

Scales minute, rough; cheek with small, bony, star-like plates. The height of the body is one-half or two-fifths of the total length (caudal not included). The upper jaw with five or six lobate incisors on each side. Caudal spine without a prominent process posteriorly. The upper profile of the snout rather convex. Bluish-grey, with a large black mark nearly entirely covering the back, commencing with a narrow band above the orbit, including a large oval grey spot on the middle of the side, and terminating on the tail in two black bands running along the upper and lower edges of the tail and of the caudal fin; the space between these two bands is yellow, triangular, the point of the triangle being in front of the caudal spine. Base of the dorsal and anal fins grey; pectoral blackish, with a crescent-shaped yellow spot at the free margin.

From Mauritius to New Guinea.

a, b. Adult and half-grown. Amboyna. Purchased of Mr. Frank.

III. *Teeth setiform, moveable, dilated only at the extremity.*

34. **Acanthurus strigosus.**

Bennett, Zool. Journ. fasc. xiii. p. 41; *Cuv. & Val.* x. p. 243.

D. $\frac{8}{27}$. A. $\frac{3}{24}$.

The height of the body is more than one-half of the length (the caudal fin not included). Anterior profile of the snout nearly straight. Teeth setiform, with the extremity dilated and laterally serrated. Brown, with numerous bluish longitudinal lines.

Sandwich Islands. New Guinea.

a, b–c. Adult. Sandwich Islands. From the Collection of the Zoological Society.—Types of the species.

35. **Acanthurus ctenodon.**

Acanthurus ctenodon, *Cuv. & Val.* x. p. 241. pl. 289.
—— strigosus, *Bleek. Natuurk. Tydschr. Nederl. Ind.* iv. p. 264, & vi. p. 102.

D. $\frac{8}{29-30}$. A. $\frac{3}{26-27}$.

The height of the body is nearly one-half of the total length (the caudal fin not included). Anterior profile of the snout nearly straight. Teeth setiform, with the extremity slightly dilated and laterally serrated. Uniform brown (in spirits).

Ceylon. East Indian Archipelago. New Guinea. New Hebrides. Caroline Islands.

a. Adult: skin. Ceylon. From Dr. Kelaart's Collection.
b, c. Fine specimens. Amboyna. Purchased of Mr. Frank.
d. Half-grown. Ceram. Purchased of Mr. Stevens.
e. Adult: stuffed. Aneiteum. From Mr. Macgillivray's Collection.

IV. *With only five to three dorsal spines.*

36. **Acanthurus rhombeus.**

Acanthurus flavescens, *Benn. Zool. Journ.* iv. 1828, p. 40.
—— rhombeus, *Kittl. in Mus. Senckenb.* i. p. 196. tab. 13. fig. 6.
—— scopas, *Cuv. & Val.* x. p. 245. pl. 290; *Bleek. Natuurk. Tydschr. Nederl. Ind.* 1851, p. 348; *Guichen. in Ramon de la Sagra, Cuba, Poiss.* p. 122.
—— altivelis, *Cuv. & Val.* x. p. 249.

D. $\frac{5}{24}$. A. $\frac{3}{20}$. V. 1/5.

The body is as high as long (head and caudal fin not included). Snout very produced; six lobate teeth on each side of the upper jaw. Scales minute, rough; tail with numerous small prickles before the caudal spine. Dorsal and anal fins more or less elevated. Brownish-black; the membranaceous sheath of the caudal spine white; head and anterior part of the body generally with minute whitish dots and fine undulated lines; sometimes a short whitish longitudinal band above the pectoral.

From Mauritius to the western parts of Polynesia. Coast of Cuba.

a, b. Fine specimens. Ceram.
c. Adult: stuffed. Sandwich Islands.
d. Half-grown: stuffed. Aneitcum. From Mr. Macgillivray's Collection.
e, f, g–h. Adult and half-grown.

It is a very remarkable fact, that, according to Guichenot, this species is found also in the Caribbean Sea.

37. **Acanthurus goramensis.**

Bleeker, Goram, p. 308.

$D. \frac{5}{24}. \quad A. \frac{3}{20}.$

The height of the body is two-thirds of the total length (the caudal fin not included). Snout very produced; six lobate incisors on each side of the upper jaw. Scales minute, rough. Dorsal and anal fins elevated. Brownish-violet: head and thorax lighter, with minute blue dots; body with about sixteen blue transverse streaks, and with a greyish band, descending obliquely from the suprascapula towards the side; vertical fins brownish-violet. (*Bl.*)

Sea of Goram.

Closely allied to *A. rhombeus.*

38. **Acanthurus xanthurus.**

Blyth in Kelaart's Prodr. Faun. Ceylan. Append. p. 50.

$D. \frac{5}{24}. \quad A. \frac{3}{21}.$

Wholly black, with golden-yellow tail. (*Blyth.*)

Coast of Ceylon.

39. **Acanthurus gemmatus.**

Cuv. & Val. x. p. 255.

$D. \frac{4}{28}. \quad A. \frac{3}{24}.$

The height of the body is contained twice and a fifth in the total length (caudal fin included). The eye is scarcely above the middle of the height of the head. Caudal truncated; dorsal and anal spines rather strong, the anterior very short. Dorsal and anal fins moderately elevated, half as high as the body. Scales scarcely perceptible. Seven lobate teeth on each side of the upper jaw. Dark brown, covered all over with white spots, which are disposed in longitudinal series on the body; caudal immaculate. (*Val.*)

Mauritius.

40. Acanthurus velifer.

Acanthurus velifer, *Bloch,* ix. p. 106. taf. 427. fig. 1; *Bl. Schn.* p. 215; *Lacép.* iv. pp. 547, 553 (not *Val., Rüpp.,* or *Bleek. Cocos,* iv. p. 451); *Bleek. Batoe,* p. 315.
—— blochii, *Benn. in Proc. Zool. Soc.* 1835, p. 207.

$$\mathrm{D}.\ \tfrac{4}{28}.\quad \mathrm{A}.\ \tfrac{3}{24}.$$

The height of the body is more than one-half of the total length (the caudal fin not included). Dorsal and anal fins elevated. Yellowish-red, with ten brown cross-bands reaching from the back to the belly, the two anterior and the last being much broader than the others: the first from the neck through the eye; the second touching the operculum and running to the anus; those on the body are divided by one or two bluish streaks into two or three parallel portions. Dorsal and anal fins violet, the former with seven or eight blue bands which are interrupted anteriorly, forming spots; anal fin with three or four similar bands; caudal fin colourless, posteriorly with a darker margin.

Sea of Batoe.

a. Stuffed: sixteen inches long and fourteen high. Feejee Islands. Voyage of H.M.S. Herald.—The colours of this specimen having faded, we are not certain whether it belongs to this species.

41. Acanthurus hypselopterus.

Bleek. Floris, p. 327.

$$\mathrm{D}.\ \tfrac{4}{31}.\quad \mathrm{A}.\ \tfrac{3}{25}.$$

The height of the body is two-fifths of the total length (the caudal fin included). Dorsal and anal fins elevated. Blackish-violet; snout dotted with blue. Body with six yellow cross-bands, edged with blue: the first across the præoperculum; the second from the neck, across the operculum. Dorsal and anal fins violet; caudal with the base yellow. (*Bl.*)

Sea of Larantuka.

42. Acanthurus desjardinii.

Benn. Proc. Zool. Soc. 1835, p. 127.

$$\mathrm{D}.\ \tfrac{3}{29}.\quad \mathrm{A}.\ \tfrac{3}{23}.$$

The height of the body is more than one-half of the total length (the caudal fin not included). Dorsal and anal fins elevated. Body with dark-brown cross-bands, extending to the belly, and with bluish transverse streaks. Snout and thorax with bluish dots. The first cross-band from the neck through the eye to the interoperculum, separated from the second by a greyish interspace; the second from the origin of the dorsal to the root of the pectoral; the others partly lined, partly divided by the bluish streaks, which are continued on the dorsal and anal fins, forming there arched bands; both fins with round bluish spots anteriorly; caudal fin entirely dotted with bluish.

Mauritius.

a. Fine specimen. Mauritius. From the Collection of the Zoological Society.—Type of the species.

43. Acanthurus rüppellii.

Acanthurus velifer, part., *Cuv. & Val.* x. p. 251.
—— velifer, *Rüpp. Atl. Fische,* p. 58. taf. 15. fig. 2; *Bleek. Cocos,* iv. p. 451.
—— rüppellii, *Benn. in Proc. Zool. Soc.* 1835, p. 207; *Bleek. Batoe,* p. 316.

D. $\frac{3}{29}$. A. $\frac{3}{22-23}$. Vert. 9/13. Cæc. pylor. 7.

The height of the body is one-half of the total length (the caudal fin not included). Dorsal and anal fins elevated. Bluish-grey, with six dark-brown cross-bands, which extend only to the middle of the side: the first from the neck through the eye to the interoperculum, dotted with yellow, like the whole head and the thorax; there are seventeen to twenty yellow transverse lines on and between the brown cross-bands, running parallel to them; the lower half of the belly with round yellowish spots. Dorsal and anal fins dark violet, with yellow bands which are interrupted anteriorly, forming spots; seven bands on the dorsal and four on the anal fin. Caudal with yellow spots on the basal half, violet towards the margin, which is blue.

From the Eastern coasts of Africa to New Guinea.

a. Stuffed. Red Sea. From Dr. Rüppell's Collection.

44. Acanthurus suillus.

Renard, i. 14. fig. 82.
Acanthurus suillus, *Cuv. & Val.* x. p. 254.

This fish is known only from an old Dutch drawing, badly copied by Renard, and considered by Valenciennes as allied to *A. velifer* on account of its elevated dorsal and anal fins. It is represented as light greyish-brown, minutely dotted and spotted with black. Fins grey, with a reddish line along the base of the dorsal and anal fins.

Mauritius.

2. ACRONURUS*.

Acanthurus, sp., *Cuv. & Val.* x. p. 237.

A single series of lobate incisors in the jaws. A moveable spine in a groove on each side of the tail. Ventral fins composed of one spine and several soft rays. One dorsal fin, the spinous portion of which is of less extent than the soft. Anal spines three. Scales none; skin with vertical striæ. A broad silvery band across the opercles and the thorax. Branchiostegals five.

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* This name is taken from Gronow, who intended to apply it to the fishes of this family. A doubtful species is—

1. Acanthurus melas, *Cuv. & Val.* x. p. 241.—Ceylon.

Small herbivorous fishes from the tropical seas.

1. Acronurus orbicularis.

Acanthurus orbicularis, (*Quoy & Gaim.*) *Cuv. & Val.* x. p. 237.

B. 5. D. $\frac{9}{28}$. A. $\frac{3}{27}$.

The height of the body is four-fifths of the length (the caudal fin not included). Yellowish, with some blackish blotches; fins yellowish.

Island of Guam.

2. Acronurus melanurus.

Acanthurus melanurus, *Cuv. & Val.* x. p. 240; *Bleek. Amb. & Cer.* p. 271.

D. $\frac{8}{25}$. A. $\frac{3}{25}$.

The height of the body is three-fifths of the length (the caudal fin not included). The second dorsal spine is longer and stronger than the following. The cleft of the mouth is situated at some distance below the level of the orbit. Body brownish; vertical fins blackish.

East Indian Seas.

a. Borneo. Presented by Vice-Admiral Sir E. Belcher, C.B.

3. Acronurus brevispinis.

D. $\frac{9}{?}$. A. $\frac{3}{?}$. V. 1/2.

The height of the body is contained once and four-fifths in the length (the caudal fin not included). The first dorsal spine is very short; the second stouter, but shorter than the following. The cleft of the mouth is situated somewhat above the middle of the arch formed by the upper and lower profiles of the snout, immediately below the level of the orbit. Reddish-white, with the usual silvery cross-band.

Hab. ——?

a. Fifteen lines long.—None of the soft dorsal and anal rays can be distinguished, and are probably lost. There appear to be only two soft anal rays. The crests on the upper side of the head are serrated.

4. Acronurus argenteus.

Acanthurus argenteus, *Quoy & Gaim. Voy. Uran. Zool.* p. 372. pl. 63. fig. 2; *Cuv. & Val.* x. p. 239.

D. $\frac{9}{27}$. A. $\frac{3}{26}$.

The height of the body is one-half of the length (the caudal fin not included). Nearly uniform dull yellowish.

Sandwich Islands. Marianes. Ascension Island.

a. Adult. Ascension. Voyage of H.M.S. Chanticleer.

3. PRIONURUS.

Prionurus, *Lacép. Ann. Mus.* iv. p. 205.

A single series of compressed denticulated incisors in each jaw. Tail with a series of several keeled, bony laminæ. Ventral fins composed of one spine and five rays. One dorsal fin, the spinous portion of which is less developed than the soft and composed of eight or nine spines; anal spines three. Scales minute. Branchiostegals five; air-bladder large, forked posteriorly. Intestinal tract with several circumvolutions; pyloric appendages five.

Herbivorous fishes from the coast of Japan and the Galapagos Islands.

1. **Prionurus microlepidotus.**

Lacép. Ann. Mus. iv. p. 205; *Cuv. & Val.* x. p. 295. pl. 292.

D. $\frac{8}{22}$. A. $\frac{3}{21}$. V. 1/5. Cæc. pylor. 5.

Snout moderately produced, with the upper profile straight. A series of six laminæ on each side of the tail; a pair of small ones above, and another below that series. Uniform brownish.

Hab. —— ?

2. **Prionurus scalprum.**

Acanthurus scalprum, *Langsd.*
Prionurus scalprum, *Cuv. & Val.* x. p. 298; *Schleg. Faun. Japon. Poiss.* p. 129. pl. 70.
Naseus scalprum, *Bleek. Act. Soc. Sc. Indo-Nederl.* vi., *Japan*, vi. p. 79.

D. $\frac{9}{24}$. A. $\frac{3}{22}$. V. 1/5.

Snout produced, with the upper profile very slightly concave. A series of four or five laminæ on each side of the tail. Nine incisors on each side of the upper jaw. Uniform blackish.

Sea of Japan.

a, b. Adult: stuffed. Japan. Purchased of Mr. Frank.

3. **Prionurus laticlavius.**

Valenc. in Voy. Vénus, Poiss. p. 335. pl. 7. fig. 2.

D. $\frac{8}{28}$. A. $\frac{3}{25}$.

Snout produced, with the upper profile very concave. A series of three laminæ on each side of the tail. Eight incisors on each side of the upper jaw. Yellowish: brown along the sides. (*Val.*)

Galapagos Islands.

4. NASEUS*.

Naseus, *Commerson.*
Monoceros, *Bl. Schn.* p. 180.

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* 1. Naseus punctulatus, *Cuv. & Val.* x. p. 289.—*Hab.* —— ?
2. —— unicolor. *Liénard* (*Dix. Rapp. Soc. Hist. Nat. Maur.* p. 38) gives the following insufficient description: "Deux lances à la queue. Bleu

Naso, *Lacép.* iii. p. 106.
Aspisurus, (*Lacép.*) *Rüpp. Atl. Fische,* p. 60.
Naseus, Axinurus, et Priodon, *Cuv. & Val.* x. pp. 257, 299, 302.

A single series of slightly compressed incisors, which are sometimes denticulated, in the jaws. Tail with two (rarely one or three) bony plates, which are very distinct and sharply keeled in adult, indistinct or entirely absent in immature and young specimens. Head sometimes with a bony horn- or crest-like prominence. Ventral fins composed of one spine and three rays. One dorsal fin, the spinous portion of which is much less developed than the soft, and composed of four to six spines; anal spines two. Scales minute, rough, forming a sort of shagreen covering. Branchiostegals four or five; pseudobranchiæ well developed; air-bladder large, forked posteriorly. Intestinal tract with many circumvolutions; five to eight pyloric appendages.

Herbivorous fishes inhabiting the tropical seas from the eastern coasts of Africa to Polynesia.

* Forehead with a more or less elongate conical horn-like protuberance in adult specimens.

1. Naseus unicornis.

Monoceros piscis, *Willughby,* p. 150. t. O. 4.
—— minor, *Willughby,* p. 216.
Chætodon, sp., *Hasselq. Iter Palæst.* p. 332. no. 71.
—— unicornis, *Forsk.* p. 63, and *Icon.* tab. 23; *L. Gm.* i. p. 1268.
Monoceros raii, *Bl. Schn.* p. 181.
—— biaculeatus, *Bl. Schn.* p. 180. tab. 42.
Naso fronticornis, *Lacép.* iii. pp. 105, 106. pl. 7. fig. 2.
Acanthurus unicornis, *Shaw, Zool.* iv. p. 374. pl. 50.
Aspirurus unicornis, *Rüpp. Atl. Fische,* p. 60.
Naseus fronticornis, (*Commers.*) *Cuv. & Val.* x. p. 259; *Faun. Japon. Poiss.* p. 129. pl. 69; *Richards. Ichth. Chin.* p. 244; *Bleek. Batoe,* iii. p. 238; *Cuv. Règne Anim. Ill. Poiss.* pl. 72. fig. 2.
—— longicornis, *Cuv. in Guér. Iconogr. Poiss.* pl. 35. fig. 3.
Harpurus monoceros, *Forst. Descript. Anim. ed. Licht.* p. 219.
Acronurus ægyptius, *Gronov. Syst. ed. Gray,* p. 191.†
—— corniger, *Gronov. Syst. ed. Gray,* p. 192.

D. $\frac{(5)\ 6}{(31-)28}$. A. $\frac{2}{26-27(-30)}$. Cæc. pylor. 7–8. Vert. 9/12.

Forehead produced into a horn-like protuberance, longer or shorter according to age, horizontal, and on a level with the upper half of the orbit. Snout produced beyond the tip of the horn (sometimes the horn is a little longer); the length of its upper profile, taken from the base of the horn, is more than twice the distance of

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noirâtre sur le dos, moins foncée sur le ventre et presqne noire aux nageoires. Sa caudale est si légèrement échancrée qu'elle semble carrée. D. $\frac{6}{30}$, A. $\frac{2}{30}$."—Mauritius.

† Gronow gave this denomination to the fish described by Hasselquist, not having been aware that the Swedish traveller mentions the horn of the forehead in his description only in the passage which is headed "*Branchiæ.*"

the orbit from the first dorsal spine. Teeth slightly compressed, tapering, of moderate size, not serrated. The height of the body is two-fifths or two-sevenths of the total length (the caudal fin not included). Two spiniferous plates on each side of the tail. The length of the fifth dorsal spine is rather more than, or equal to, its distance from the first. Brownish-grey: dorsal and anal fins with longitudinal blue stripes.

From the Red Sea to the coasts of Japan and to Polynesia.

a. Skin: twenty-two inches long; horn three inches. Ceylon. From Dr. Kelaart's Collection.

b. Skin: twenty inches long; horn two inches. From the Collection of the Zoological Society.

c. Stuffed: eighteen inches long; horn fifteen lines. Old Collection.

d. Skin: eighteen inches long; horn eighteen lines. Frankland Island. D. $\frac{5}{31}$, A. $\frac{2}{30}$.

e. Stuffed: fifteen inches long; horn ten lines.

f. Skin: thirteen inches long; horn six lines. From the Collection of the Zoological Society.

g. Stuffed: eleven inches long; horn three lines. Red Sea. From Dr. Rüppell's Collection.

h. Stuffed: ten inches and a half long; horn three lines. Aneiteum. From Mr. Macgillivray's Collection.

2. Naseus brachycentron.

Cuv. & Val. x. p. 275.

D. $\frac{5}{29}$. A. $\frac{2}{28}$.

Forehead produced into a horn-like protuberance, the axis of which passes through the orbit. Snout produced. Two spiniferous plates on each side of the tail. Dorsal spines very strong, but only half as long as in *N. unicornis*. Uniform grey (in a dried state). (*Val.*)

Waigiou.

3. Naseus tripeltes.

Renard, i. pl. 4. fig. 23; *Valent.* fig. 518.
Naseus tripeltes, *Cuv. & Val.* x. p. 276.

Forehead produced into a horizontal horn. Three bony carinated plates on each side of the tail.

Malayan Archipelago.

This species is known only from the old Dutch drawings, and has not yet been recognized.

4. Naseus brevirostris.

Renard, i. 24. 130.
Naseus brevirostris, *Cuv. & Val.* x. p. 277. pl. 291; *Bleek. Celebes*, iv. p. 165, and *Celebes*, viii. p. 306.
—— hoedtii, *Bleek. Amboina*, iv. p. 339.

D. $\frac{6}{29}$. A. $\frac{2}{30}$. Vert. 9/13.

Forehead produced into a horn-like protuberance, longer or shorter according to age, the horn being horizontal, with its axis passing through the centre of the eye. The horn, in young specimens, soon reaches beyond the snout, which is very short; the anterior profile of the snout is subvertical, and its length, taken from the base of the horn, is about equal to the diameter of the orbit. Teeth exceedingly small, finely serrated. The height of the body is one-third, or rather more than one-third of the total length (the caudal fin included). The length of the fifth dorsal spine equals its distance from the origin of the fin. Greyish-brown, with numerous short blue transverse lines posteriorly; caudal light-coloured on its posterior half, its margin being green.

From Mauritius to Polynesia.

This species has not yet been found in the Red Sea. The specimens determined by Dr. Rüppell as *N. brevirostris* (N. W. Fische, p. 130) are immature specimens of *N. fronticornis* (as he himself supposes), but entirely different from the present species.

a. Stuffed: thirteen inches long; horn fifteen lines. Ceylon. From Dr. Sibbald's Collection.
b. Eleven inches long; horn one inch. Malayan Archipelago. Presented by Sir J. Richardson.
c. Eight inches long; horn four lines. Macassar.
d. Eight inches long; horn three lines. Amboyna. Purchased of Mr. Frank.
e. Seven inches and a half long; horn three lines: stuffed. Port Resolution (Tana). From Mr. Macgillivray's Collection.
f. Six inches and a half long; horn one line. Aneiteum. From Mr. Macgillivray's Collection.
g. Adult: skeleton. From the Haslar Collection.

The *skeleton* has a great similarity to that of *Acanthurus*. The form of the skull would be nearly the same but for the horn-like protuberance on the forehead. The crown of the head is short and convex, and there is a short triangular crest on the anterior portion of the supraoccipital. The hinder side of the occiput has a vertical groove above the *foramen occipitale* and a pair of short protuberances, which are present also in *Acanthurus*. The principal frontals are convex, smooth, porous, not much narrower between the orbits than behind them. The præfrontals are not prominent, forming the front margin of the orbit. The borders of the principal frontals and of the præfrontals being very distinct, I conclude that the horn is formed only by the turbinal bones, which, as we have seen above, are well developed also in *Acanthurus*. The same bones form the rostral process in *Malthe* (see p. 202). The bones of the jaws are as short as in *Acanthurus*, but less strong and thick, the teeth being much smaller than in that genus; the maxillary and intermaxillary are firmly and immoveably joined together, and the latter has its posterior processes extremely short. The lower jaw is elevated, rather thin. Palatines short; the bones of the tympanic cavity well ossified; the epitympanic especially is well developed, and occupies the whole of the anterior side of the præoperculum. The præorbital is thin and very elongate, and does not enter the orbit, except by a cartilaginous process; the remainder of the infraorbital ring is very narrow and, posteriorly, in immediate contact with the epitympanic. The limbs of the præoperculum meet at a very obtuse angle, and the posterior is twice as long as the inferior. Operculum rather narrow and elevated, not extending downwards to the angle of the præoperculum, where it is replaced by the suboperculum; the latter is not much smaller than the operculum. Interoperculum very small.

The bones of the humeral arch are rather strong: suprascapula small, firmly united with the skull; scapula long, sword-shaped; coracoid very long and strong, straight, with a longitudinal ridge on its inner side. The cavity for the pectoral muscles is deep, but not so broad as in *Acanthurus*; its bottom is thin and transparent, though nearly entirely osseous, the ulna having a small foramen, the radius a larger and a smaller one. Carpal bones very small. The pubic bones are very long, slightly bent, and firmly attached to each other; each is formed by a narrow vertical lamella terminating in a styliform process anteriorly.

There are nine abdominal and thirteen caudal *vertebræ*, the length of the former portion of the vertebral column being to that of the caudal as 1 : 2·3. The vertebræ are slightly compressed; the anterior short, the middle and the caudal ones rather long. The apophyses are of moderate length and strength, and dilated posteriorly into a more or less broad lamella; the lamellæ of the neurals and interneurals of the abdominal vertebræ are broad enough to form together one continuous osseous plane, without free spaces between the single bones. The first interneural is strong, bent forwards, so that its upper extremity overlaps the occipital region of the skull; it is provided superiorly with a subglobular cavity, in which a round bony tubercle (a rudimentary first dorsal spine) moves; this interneural does not terminate in a spine directed forwards, as in *Acanthurus*. The second interneural is firmly attached to the first; the interneurals of the following dorsal spines are dilated superiorly into a slightly concave and oblong plate, and one always corresponds to a single neural, whilst each neural and hæmal of the caudal vertebræ always support two or three interneurals and interhæmals of the soft rays. The first hæmal and interhæmal form one strong bone, much bent forwards, and slightly dilated at its inferior extremity; the five following interhæmals are fixed to it. Ribs moderately developed, with epipleurals.

	lines.
Length of the first vertebra	$0\frac{1}{3}$
——— of the second vertebra	1
——— of the third vertebra	$1\frac{1}{2}$
——— of the fourth vertebra	$2\frac{1}{3}$
——— of the tenth vertebra	4
——— of the fourteenth vertebra	$4\frac{1}{2}$
——— of the eighteenth vertebra	5

	lines.
Length of the nineteenth vertebra	$3\frac{3}{4}$
——— of the twenty-first vertebra	$2\frac{1}{4}$
——— of the abdominal portion	22
——— of the caudal portion	50
——— of the eleventh neural spine	8
Width of the curve of the hæmal bone	26

5. Naseus olivaceus.

Chætodon olivaceus, *Solander, MS. Brit. Mus.* with figure.
Naseus olivaceus, *Cuv. & Val.* x. p. 288.

D. $\frac{5-6}{30-28}$. A. $\frac{2}{28-29}$.

Forehead with a more or less projecting protuberance opposite to the upper half of the orbit. The snout is moderately produced, with the upper profile rather concave; the length of that profile is about twice the distance of the orbit from the dorsal fin. Teeth very slightly compressed, tapering at the extremity, about thirteen on each side of the upper jaw. The height of the body is one-half of the total length (the caudal fin not included). The length of the fifth dorsal spine equals its distance from the first. Caudal plates rather small. Greyish-olive: base of the caudal plates blue; dorsal fin with two series of whitish dots; anal with two longitudinal lines along the middle.

Otaheiti. Philippine Islands.

a. Four inches long. Otaheiti.—Type of the species. D. $\frac{6}{28}$, A. $\frac{2}{28}$. Scarcely any frontal protuberance.

b. Six inches and a half long. Philippine Islands. From Mr. Cuming's Collection.—D. $\frac{5}{30}$, A. $\frac{2}{29}$. Frontal protuberance just conspicuous.

c. Stuffed: ten inches long.—D. $\frac{6}{29}$, A. $\frac{2}{29}$. Frontal protuberance two lines long.

6. Naseus annulatus.

Priodon annulatus, *Quoy & Gaim. Voy. Uran. Zool.* p. 377 (young).
Naseus marginatus, *Cuv. & Val.* x. p. 280 (adult).
Priodon annularis, *Cuv. & Val.* x. p. 302. pl. 294 (young); *Bleek. Amboina*, ii. p. 558.
Naseus annulatus, *Bleek. Celeb.* viii. p. 304.

D. $\frac{5\ (6)}{28-29}$. A. $\frac{2}{28-29}$. Cæc. pylor. 5.

Forehead with a more or less projecting protuberance, situated below the level of the centre of the orbits. The snout is moderately produced. Teeth very small, with a very fine serrature on the apical half. The length of the fifth spine is nearly equal to its distance from the first. Caudal plates very small, scarcely keeled, and in young individuals absent. Brown: anal with one or two bluish longitudinal bands; dorsal and anal with a narrow, caudal with a rather broad, white edge. Young specimens with a white ring round the tail.

East Indian Archipelago. Polynesia.

a–c. Six to ten inches long: stuffed: protuberance just conspicuous. Aneiteum. From Mr. Macgillivray's Collection.

** A convex and compressed hump above the snout in adult specimens.

7. Naseus tuberosus.

Renard, i. fig. 79; *Valent.* iii. p. 386. fig. 119, & p. 499. fig. 478.
Naso tuberosus, *Lacép.* iii. p. 111. pl. 7. fig. 3.
Acanthurus nasus, *Shaw*, *Zool.* v. p. 376. pl. 51.
Naseus tuber, *Cuv. & Val.* x. p. 290.
? Naseus tonganus, (*Quoy & Gaim.*) *Cuv. & Val.* x. p. 292.
Naseus vlamingii, *Cuv. & Val.* x. p. 293; *Bleek. Batav.* p. 472.

$$D. \frac{5-6}{27-30}. \quad A. \frac{2}{27-28}.$$

The anterior profile of the snout is convex, in mature specimens very prominent, like a crest. Teeth slightly compressed, small, tapering, about twenty on each side of the upper jaw. Brown, with black (blue) dots or short vertical lines; fins blackish, the vertical with white margins.

From Mauritius to Polynesia.

a. Twenty-two inches long: stuffed. Ceylon. From Dr. Sibbald's Collection.—Caudal spines very strong; crest very convex.
b. Young. Ceram. From Madame Ida Pfeiffer's Collection.—Caudal spines none; profile of the snout slightly convex.
c, *d*. Adult and young: stuffed. Aneiteum. From Mr. Macgillivray's Collection.
e. Fine specimen.
f. Half-grown: stuffed. Old Collection.
g, *h*. Adult: skins. From the Collection of the Zoological Society.

Young specimens have the dorsal spines much more slender and longer than adult ones. The form of the caudal fin is subject to great variation, as in many fishes of this and other families, some individuals having it nearly truncated behind, whilst in others the lobes are produced into long filaments. *N. tonganus* is founded on a specimen which is said to have been immaculate. *N. tuberosus* is a species, in which the height of the body, the profile of the snout, the length and number of the dorsal spines, the size of the caudal spiniferous laminæ, the form of the caudal fin, and, as it appears, the colours, are variable, and chiefly dependent on age.

*** Head without horn or hump in mature specimens.

8. Naseus lituratus.

Valent. iii. p. 371. fig. 77; *Renard*, i. 23. 128.
Harpurus lituratus, *Forst. Descr. Anim. ed. Licht.* p. 218.
Acanthurus lituratus, *Bl. Schn.* p. 216.
—— harpurus, *Shaw*, *Zool.* iv. p. 381.
Aspisurus elegans, *Rüpp. Atl. Fische*, p. 61. taf. 16. fig. 2.

? Aspisurus carolinarum, *Quoy & Gaim. Voy. Uran. Zool.* p. 375. pl. 63. fig. 1.
Prionurus eoume, *Less. Voy. Coq. Zool.* ii. p. 151.
Naseus lituratus, *Cuv. & Val.* x. p. 282; *Bleek. Celeb.* iii. p. 763.
? Naseus carolinarum, *Cuv. & Val.* x. p. 287.
Aspisurus lituratus, *Rüpp. N. W. Fische*, p. 130.

D. $\frac{6}{29-31}$. A. $\frac{2}{30-31}$. Cæc. pylor. 8. Vert. 9/13.

Forehead without horn. Snout rather produced. Teeth compressed, of moderate size, thirteen or fifteen on each side of the upper jaw. Dorsal spines strong and stout, the length of the fifth being less than its distance from the first. Brown: end of the tail white; a green streak commences at the eye and nostril, and descends in a curve to the angle of the mouth. Back with a blue line along the base of the dorsal fin; dorsal fin black, with a broad whitish margin, and with a white band running near and along the edge of the black colour. Caudal with a green and white margin posteriorly; anal with a narrow black and white margin.

From the Red Sea to Polynesia.

a–c. Adult. Otaheiti. From Forster's Collection.—Types of the species.
d–e. Adult and half-grown: stuffed. Aneiteum. From Mr. Macgillivray's Collection.
f. Fine specimen. Malayan Archipelago. Presented by Sir J. Richardson.
g. Adult: stuffed. Red Sea. From Dr. Rüppell's Collection.
h. Fine specimen. From the Haslar Collection.
i. Adult: skeleton. From the Haslar Collection.

The *skeleton* does not differ essentially from that of *N. brevirostris.* The teeth being somewhat stronger in this species, the bones of the jaws are rather thicker and stouter. The principal frontal bones do not extend forwards beyond the level of the orbit; the præfrontals occupy, as usual, the front part of the orbit; the turbinal bones are well ossified, and situated immediately behind the maxillary: the space on each side of the upper surface of the snout, between the principal frontal, præorbital and turbinal, is occupied by a long bone, which may be considered as the separate anterior portion of the principal frontal; a narrow strip of the ethmoid intervenes between these two peculiar bones, but as it does not extend so far backwards as they do, an oblong free space remains, leading into the interior of the cavity of the skull.

	lines.
Length of the first vertebra	0⅓
——— of the second vertebra	1⅓
——— of the third vertebra	1¾
——— of the fourth vertebra	2¼
——— of the tenth vertebra	3
——— of the fourteenth vertebra	3¼
——— of the seventeenth vertebra	3⅔
——— of the nineteenth vertebra	3
——— of the twenty-first vertebra	2

	lines.
Length of the abdominal portion	20
——— of the caudal portion	38
——— of the eleventh neural..............	8
Width of the curve of the hæmal bone	25

9. Naseus hexacanthus.

Priodon hexacanthus, *Bleek. Amboina*, vi. p. 421.

D. $\frac{6}{28}$. A. $\frac{2}{29}$.

The height of the body is one-third of the total length; the upper profile of the snout nearly straight. Teeth denticulated at the extremity, sixteen to twenty on each side of the jaws. Tail with two small laminæ on each side, which are not keeled. Brown: dorsal fin with three, anal with two blue longitudinal stripes. (*Bleek.*)

Amboyna. Batu.

10. Naseus tapeinosoma.

Priodon tapeinosoma, *Bleek. Amboina*, v. p. 494.

D. $\frac{5}{29}$. A. $\frac{2}{28}$.

The height of the body is contained thrice and a third in the total length; the upper profile of the snout nearly straight. Teeth denticulated at the extremity, about twenty on each side of the upper jaw. Tail on each side with two small laminæ, which are not keeled. Brown: vertical fins edged with yellow; anal with two dark-brown longitudinal streaks. (*Bleek.*)

Amboyna.

11. Naseus thynnoides.

Axinurus thynnoides, *Cuv. & Val.* x. p. 299. pl. 293; *Cuv. Règne Anim. Ill. Poiss.* pl. 74. fig. 3.

Naseus thynnoides, *Bleek. Act. Soc. Sc. Indo-Nederl.* ii., *Amboina*, p. 61.

D. $\frac{4}{28-30}$. A. $\frac{2}{28-29}$. Cæc. pylor. 3.

The height of the body is nearly one-third of the total length (the caudal fin not included). Only one trenchant lamina on each side of the tail. Teeth very small, tapering, not serrated. The upper profile of the snout convex. Greyish: dorsal and anal fins with oblique dark lines.

Seas of New Guinea and Amboyna.

a. Fine specimen. Amboyna. Purchased of Mr. Frank.

5. KERIS.

Keris, *Cuv. & Val.* x. p. 304.

A single series of small teeth in the jaws. Tail without bony laminæ, in an adult state. Ventral fins composed of one spine and three (five) rays. One dorsal fin, the spinous portion of which is less developed than the soft, and composed of six spines; anal spines two. Branchiostegals four.

East Indian Archipelago.

The doubts raised by Dr. v. Bleeker against the validity of this genus appear to be very just; we prefer, however, to admit it into the system, until further evidence is gained from a re-examination of the typical specimen, as well as from its comparison with the species discovered by Dr. v. Bleeker. If the bony laminæ on the tail were absent in adult individuals, if the ventral fin had five soft rays, as Valenciennes says, and if the system of coloration were similar to that of *Acronurus*, the genus would really be different from *Naseus*; but none of these characters have been confirmed by the Dutch ichthyologist.

1. **Keris anginosus.**

? Keris anginosus, *Cuv. & Val.* x. p. 304. pl. 295.
Priodon anginosus, *Bleek. Amboina*, v. p. 492.

D. $\frac{6}{26}$. A. $\frac{2}{28-29}$. V. 1/3.

The height of the body is somewhat more than one-half of the total length. The anterior profile of the snout rather concave. Teeth minutely denticulated, about eleven on each side. Abdomen very prominent; root of the ventrals anterior to that of the pectorals. Tail without laminæ. Orange-coloured: lips brown; a brown band from the neck through the eye; body with brownish spots arranged in six or seven transverse bands; dorsal and anal fins with two or three series of brownish spots.

Amboyna. Ceram. Kokos Islands. Celebes.

The diagnosis is taken from Bleeker's description. It does not appear to be fully proved that the specimens which served for Valenciennes and Bleeker's descriptions are specifically identical. These scruples are increased by a comparison of the figure and description given by the French naturalist, as they do not agree with each other. When we consult the figure, it would appear as if the fish in the Paris Collection were similar to the species of *Acronurus*, having the broad silvery band across the thorax, and the skin transversely striated; yet Valenciennes describes the skin as "couverte de petites granulations carrées, oblongues, fines, et placées comme de la mosaïque."

2. **Keris amboinensis.**

Bleeker, Amboina & Ceram, p. 272.

B. 4. D. $\frac{6}{29}$. A. $\frac{2}{30}$. V. 1/3.

The height of the body is one-half or rather less than one-half of the total length. Teeth very small, conical. Abdomen very prominent; root of the ventrals situated before the pectorals. Brown: the spinous portion of the dorsal fin brown, the soft and the anal with three or four longitudinal series of small blackish-brown spots; caudal fin yellow, brown at the base.

East Indian Archipelago.

a. Forty-two lines long. Amboyna. Purchased of Mr. Frank.

This is probably the young of a species of *Naseus*, closely allied to, or perhaps identical with, *N. annulatus*.

Fam. 31. HOPLEGNATHIDÆ.

Hoplegnathoidei, *Bleeker, Verhand. Akad. Wetensch. Amsterd.* i. 1854, *Japan*, p. 6.

Body compressed and elevated, covered with very small ctenoid scales. Lateral line continuous. *The bones of the jaws have a sharp trenchant dentigerous edge, as in Scarus,*—the teeth, if at all conspicuous, being continuous with the substance of the bones, forming a more or less distinct serrature of the edges; no teeth on the palate; the lower pharyngeal bones not united. The spinous portion of the dorsal fin is rather more developed than the soft, the spines being strong; anal with three spines, similarly developed as the soft dorsal; ventrals thoracic, with one spine and five soft rays.
Australian, Japanese, and Chinese Seas.

Only one genus.

1. HOPLEGNATHUS.

Oplognathus, *Richards. Proc. Zool. Soc.* 1840, p. 27.
Scaradon, *Schleg. Faun. Japon. Poiss.* p. 89.

The spinous dorsal with twelve spines; the soft dorsal and anal rather elevated; vertical fins somewhat scaly on the basal portions.

1. Hoplegnathus conwayii.

Oplognathus conwaii, *Richards. Proc. Zool. Soc.* 1840, p. 27.
Hoplegnathus conwayii, *Richards. Trans. Zool. Soc.* iii. p. 144. pl. 7. fig. 1.

D. $\frac{12}{12}$. A. $\frac{3}{12}$.

The length of the fifth and sixth dorsal spines is three times and a third in the length of the head.
Australia?

2. Hoplegnathus fasciatus.

Krusenstern, Reise, tab. 52. fig. 2.
Scaradon fasciatus, *Temm. & Schleg. Faun. Japon. Poiss.* p. 89. pl. 46. figs. 1, 2.
Hoplegnathus fasciatus, *Richards. Ichth. Chin.* p. 247; *Bleek. l. c.* p. 6.

D. $\frac{12}{16}$. A. $\frac{3}{12}$.

Brownish, irregularly maculated with darker. Young with seven blackish bands.
Japan.

a. Half-grown: stuffed. Purchased of Mr. Frank.

3. Hoplegnathus punctatus.

Scaradon punctatus, *Temm. & Schleg. Faun. Japon. Poiss.* p. 91.
Hoplegnathus punctatus, *Richards. Ichth. Chin.* p. 247.
—— maculosus, *Richards. l. c.*

$$D. \frac{12}{16}. \quad A. \frac{3}{12}.$$

Body and the basal parts of the vertical fins with very distinct, rounded, larger and smaller dark-brown spots, which sometimes have a light centre.

Seas of China and Japan.

a. Half-grown: skin. China. Purchased of Mr. Warwick.

We have now arrived at a series of families in which the characters of the Acanthopterygian fishes are not purely preserved, but blended with others, by which a more or less close affinity to one of the following orders is indicated. Several of these families approach the Acanthopterous Pharyngognaths of Müller by the structure of their teeth and of their fins, or by the interrupted lateral line. Others are truly Malacopterygians with regard to the structure of their dorsal fin; whilst the position or the structure of the ventrals does not allow of a separation from the present order. Finally, the *Mastacembelidæ* are Eels with a spinous dorsal fin; and the *Notacanthi* are so aberrant a form, that they appear to be as distinct from Acanthopterygians and Malacopterygians as those two orders are from each other.

We begin with those families which show some affinity to the Pharyngognaths.

Fam. 32. MALACANTHIDÆ.

Labroidei, part., *Cuv. Règne Anim.*
Sciænoidei, part., *Müll. Berl. Abhandl.* 1844, p. 167.

Body elongate, covered with very small scales; head labroid (with thick lips, and with a posterior intermaxillary canine tooth). Dorsal and anal fins very long, the former with a few unarticulated rays anteriorly; ventrals thoracic, with one spine and five rays. No prominent anal papilla. Gill-opening wide, with the gill-membranes united below the throat; gills four, a slit behind the fourth; pseudobranchiæ; branchiostegals five or six; air-bladder simple; pyloric appendages none. Vertebræ 10/14.

Seas between the tropics.

Only one genus.

1. MALACANTHUS.

Malacanthus, *Cuv. Règne Anim.*; *Cuv. & Val.* xiii. p. 316.

Body elongate, slightly compressed; cleft of the mouth horizontal, with the jaws equal; eye lateral. Scales very small, minutely ciliated. One continuous dorsal, with the first four or six rays not articulated; dorsal and anal very long; the lower pectoral rays branched. Villiform teeth in both the jaws, with canines and an outer series of stronger teeth, and with a canine at the posterior extremity of the intermaxillary; no teeth on the palate. Operculum with a spine, præoperculum entire.

Atlantic coasts of Tropical America; Mauritius; Western Pacific.

1. Malacanthus plumieri.

Parra, p. 22. pl. 13. f. 1.
Coryphæna plumieri, *Bloch*, taf. 175 (very bad).
Sparus oblongus, *Bl. Schn.* p. 283.
Malacanthus plumieri, *Cuv. & Val.* xiii. p. 319. pl. 380; *Casteln. Anim. nouv. ou rares de l'Amér. Sud, Poiss.* p. 29.
—— trachinus, *Valenc. in Cuv. Règne Anim. Ill. Poiss.* pl. 90. fig. 3.

B. 6. D. $\frac{6}{59}$. A. 51–53. Vert. 10/14.

The height of the body is contained eight times and a half in the total length; the lobes of the caudal elongate, and sometimes produced into a filament.

Atlantic coasts of Tropical America.

a. Adult. Cuba. From the Collection of the Zoological Society.
b. Adult. West Indies. Purchased of Mr. Scrivener.
c, d, e. Adult and half-grown: skins and stuffed. Jamaica. From Dr. Parnell's Collection.
f. Adult: stuffed. West Indies.

g. Adult: skin. West Indies. Purchased of Mr. Scrivener.
h. Adult female: skeleton. From the Haslar Collection.
i. Ovaria of specimen *h*.

Valenciennes had already pointed out that the abdominal cavity extends into the tail, that is, into the portion behind the anus and behind the origin of the anal fin. He examined a male specimen; and to this I may add, that the ovaria are perfectly separated from each other, and that each of them is divided into two lobes by a very deep anterior notch.

Skeleton.—The maxillary is much broader in its upper half than in its lower, and not longer than the intermaxillary; the latter is armed with a series of strong teeth: the three or four anterior ones are the strongest and curved; the lateral, twenty in number, are slightly bent inwards; and the posterior, again, is stronger and curved forwards: there is a band of villiform teeth interiorly to the series described, and broadest anteriorly. The mandibula also has an outer series of stronger teeth; four of them, situated on the middle of the side, are the strongest and curved backwards, whilst ten smaller ones, occupying the posterior part of the bone, are bent forwards: there is a broad patch of villiform teeth on the anterior part of the jaw. The vomer and the palatines are flat and smooth. The præoperculum has no ridge or muciferous channel; its limbs are of equal length, and meet at an obtuse angle, which, however, is rounded. The operculum is armed with a strong, flat spine; sub- and interoperculum narrow, the latter rather elongate. The turbinal bone and the præorbital are long; the remainder of the infraorbital ring is very narrow and feeble, but provided interiorly with a broad concave plate, to support the eyeball from beneath. The upper part of the skull is rather flat, and the bones forming the brain-capsule are thin, semitransparent. There are some slight ridges posteriorly, the most feeble of which is the occipital crest; the ridges to which the suprascapula is attached are much stronger. The coracoid is exceedingly broad, formed by two bones.

The length of the *vertebral* column is not caused by an increased number of the vertebræ, but by the single vertebræ being considerably elongate. The abdominal portion is formed by ten, the caudal by fourteen vertebræ, and the length of the former is to that of the latter as 1 : 1·5. The first vertebra is much compressed in its longitudinal diameter. The ribs are slender, and provided with epipleural spines. The hæmal canal, below the first two caudal vertebræ, is extremely wide, the hæmal spines forming a complete arch. The anal fin is continued anteriorly considerably below the abdominal cavity; and there are no hæmals corresponding to the rays by which this part of the fin is formed.

2. **Malacanthus latovittatus.**

Labrus lato-vittatus, *Lacép.* iii. p. 527. pl. 28. fig. 2.
Tænianotus lato-vittatus, *Lacép.* iv. p. 304 (not pl. 3. fig. 2).

Malacanthus lato-vittatus, *Quoy & Gaim. Voy. Astrol.* iii. p. 701. pl. 20. fig. 3 (var.).
—— tæniatus, *Cuv. & Val.* xiii. p. 327. pl. 381; *Bleek. Natuurk. Tydschr. Nederl. Ind.* ii. p. 218.

B. 5. D. $\frac{4}{46}$. A. $\frac{1}{40}$. L. lat. 125.

The height of the body is one-seventh of the total length; caudal subtruncated. A broad black lateral band.

Mauritius; New Guinea.

a. Adult: stuffed. Presented by Sir A. Smith.

3. Malacanthus hoedtii.

Bleek. Act. Soc. Sc. Indo-Nederl. vi., *New Guinea*, p. 18.

D. 5 | 53. A. 50.

Operculum with a very strong and flat spine. Scales very small. Caudal fin with two parallel and horizontal black bands.

Louisiade Archipelago; New Guinea; Mauritius.

a. Stuffed. Louisiade Archipelago. Voyage of the 'Rattlesnake.'
b. Stuffed. Mauritius. From Dr. Janvier's Collection.

Description.—The body is elongate and slightly compressed, its height, above the ventral fins, being one-ninth of the total length. The length of the head (the opercular spine included) is one-fifth of the total; the space between the orbits is flat and rather broad, its width being one-fourth of the length of the head. The extent of the snout is moderate, nearly equal to the width of the head between the orbits. The cleft of the mouth is oblique, with the jaws equal anteriorly; the upper maxillary reaches beyond the anterior margin of the eye. The upper surface of the head and the snout are scaleless. The eye is rather large, $4\frac{3}{5}$ in the length of the head, and situated high up the sides. The nostrils are near the upper anterior angle of the orbit. The limbs of the præoperculum are equal in length, and meet at a rather obtuse angle. The cheeks and opercles are covered with very small scales; the operculum is small, but armed with a very strong and flat spine, which extends beyond the vertical from the origin of the dorsal fin.

The dorsal fin begins at a distance from the occiput which equals that between the occiput and the extremity of the snout. The five anterior unarticulated rays or spines are very feeble, and increase in length posteriorly, as the anterior rays do. The middle two-fourths of the fin are the highest, their height being one-third of the length of the head. The distance between the dorsal and caudal fins equals the depth of the tail below the extremity of the dorsal. The caudal is subtruncated and rather short, its length being $8\frac{2}{3}$ in the total. The anal fin begins below the thirteenth ray of the dorsal (the spines included), and ends opposite the dorsal. The anterior rays are not so short as in the dorsal fin, but, in the middle, both fins are equal in height. The pectoral is slightly rounded, the middle rays being the longest, and extends to, or somewhat beyond, the anal. The ventrals thoracic and very short, with one spine and five soft rays.

The colour (in a dried state) is a yellowish-olive, bluish-rose-coloured on the back (during life); the caudal has two deep-black parallel and horizontal bands.

Both the jaws are armed with a villiform band of teeth and with an outer series of stronger conical teeth; there is a recurved tooth at the posterior extremity of the intermaxillary bone. Palate without any teeth.

	inches.	lines.
Total length	9	6
Height of the body	1	1
Length of the head	1	11
Width of the head between the orbits	0	5½
Diameter of the eye	0	5
Height of the dorsal	0	8
Length of the caudal	1	0

Fam. 33. NANDIDÆ.

Pseudochromides, pt., et Mænoidei, pt., *Müller & Trosch. Hor. Ichth.*

Body oblong, compressed, covered with scales. *Lateral line interrupted.* Dorsal fin formed by a spinous portion and by a soft, the latter being the less developed; anal fin with three spines, and with its soft portion similar to the soft dorsal. Ventral fins thoracic, with one spine and five or four soft rays. Dentition more or less complete, generally feeble. Five or six branchiostegals; gills four, or three and a half; pseudobranchiæ present in the marine, absent or hidden in the freshwater genera. An air-bladder. No superbranchial organ.

Carnivorous fishes.

Synopsis of the Groups and Genera.

First Group: **Plesiopina.**

Pseudobranchiæ present. Ventral rays four.
From the Red Sea to the Pacific.

The first ventral ray bifid and elongate	1. Plesiops, p. 363.
None of the ventral rays elongate	2. Trachinops, p. 366.

Second Group: Nandina.

Pseudobranchiæ none. Ventral rays five. Palatine and vomerine teeth. (*Nandoidei*, Bleek.)

Freshwater fishes of the East Indies.

None of the bones of the head are serrated	3. Badis, p. 367.
The præoperculum only is serrated......................	4. Nandus, p. 367.
Præoperculum and præorbital serrated	5. Catopra, p. 368.

Third Group: Acharnina.

Pseudobranchiæ hidden. Ventral rays five. No teeth on the palate.

Freshwater fishes from Tropical America.

Bones of the bead not armed	6. Acharnes, p. 369.

First Group. PLESIOPINA.

1. PLESIOPS.

Plesiops, *Cuv. Règne Anim.*; *Müll. & Trosch. Hor. Ichthyol.* iii. p. 22.
Pharopteryx, *Rüpp. Atl. Fische,* p. 15.

Body compressed, oblong, covered with scales of moderate size; lateral line interrupted. Mouth moderately protractile. Eleven or twelve spines in the dorsal fin, three in the anal; V. 1/4. The first ventral ray is elongate, bifid. Small teeth in the jaws, on the vomer and the palatine bones. None of the bones of the head serrated. Six branchiostegals; four gills, pseudobranchiæ; an air-bladder. Pyloric appendages none.

Carnivorous fishes from the Red Sea and the East Indian Archipelago.

1. Plesiops nigricans.

Pharopteryx nigricans, *Rüpp. Atl. Fische,* p. 15. taf. 4. fig. 2, and *N. W. Fische,* p. 5.

D. $\frac{12}{8}$. A. $\frac{3}{8}$. V. 1/4.

The height of the body equals the length of the head, and is two-sevenths of the total. The maxillary extends behind the orbit. Uniform greenish-black; bluish dots on the opercles, fins, and on the lower part of the sides.

Red Sea.

This and the two following species are, according to Dr. v. Bleeker, perhaps only varieties of one, with which opinion I fully concur.

2. Plesiops cæruleo-lineatus.

Plesiops cæruleo-lineatus, *Rüpp. N. W. Fische,* p. 5. taf. 2. fig. 5; *Bleek. Amboina,* iii. p. 116.
—— melas, *Bleek. Verhand. Batav. Genootsch.* xxii., *Bali,* p. 9.

B. 6. D. $\frac{11-12}{7}$. A. $\frac{3}{8}$. V. 1/4. L. lat. 23.

The height of the body is contained four or five times in the total length, the length of the head three times and three-quarters. Snout convex. The upper maxillary extends behind the vertical from the posterior margin of the orbit. Black, each scale with a blue spot; an oblique blue longitudinal line on the dorsal and anal fins; caudal sometimes with a red band, parallel to the margins of the fin.

Red Sea. East Indian Archipelago. Coast of Australia.

a. Half-grown. Australia. From Mr. Macgillivray's Collection.

3. **Plesiops corallicola.**

Plesiops corallicola, (*K. & v. H.*) *Bleek. Sumatra*, ii. p. 280.

B. 6. D. $\frac{12}{7}$. A. $\frac{3}{8}$. V. 1/4. L. lat. 26–29. L. transv. 13.

The height of the body is two-ninths of the total length, the length of the head one-fourth. Snout convex. The upper maxillary extends behind the orbit. Brownish, each scale with a bluish dot; a blue spot on the operculum. Fins blackish-violet: a blue longitudinal line on the spinous dorsal; the soft dorsal and the anal with blue lines between the rays, each line running in the direction of the rays; caudal fin with short blue transverse streaks between the rays.

East Indian Archipelago. Feejee and Tonga Islands.

a. Adult: bad state. Moluccas. Purchased of Mr. Frank.
b–c. Adult and young. Amboyna. Purchased of Mr. Frank.
d–f. Adult and half-grown. Feejee Islands. Voyage of the 'Herald.'
g–h. Young. Tonga Islands. From the Haslar Collection.
i. Adult. China. Presented by Sir J. Richardson.
k. Young. From the Haslar Collection.

4. **Plesiops oxycephalus.**

Bleeker, Batoe, p. 320.

B. 6. D. $\frac{12}{7}$. A. $\frac{3}{8}$. V. 1/4. L. lat. 26.

The height of the body is contained three times and two-thirds to three times and three-fourths in the total length, the length of the head three times and a half. Snout pointed. The maxillary extends scarcely behind the vertical from the posterior margin of the orbit. Greenish-violet; scales with a bluish spot: dorsal fin with an oblique blue longitudinal line; the membrane between the anal rays with blue streaks; caudal with a yellow margin, and with a horseshoe-like yellow cross-band in the middle. (*Bl.*)

Seas of Batoe and Amboyna.

5. **Plesiops bleekeri.**

D. $\frac{12}{9}$. A. $\frac{3}{10}$. P. 18. V. 1/4. L. lat. 45. L. transv. 5/19.

Body with four black cross-bands.

Habitat —— ?

a. From the Haslar Collection.

Description of the specimen.—Body oblong, compressed, its height being one-third of the total length (without caudal); the length of the head is a little more than the height of the body: snout with the cleft of the mouth very oblique, and with the jaws equal anteriorly; it is as long as the diameter of the eye, which is one-fourth of the length of the head. The width of the interorbital space is less than that of the orbit. The maxillary extends a little behind the vertical from the centre of the eye, and has its posterior portion considerably dilated, and rather broader than the præorbital. The teeth are villiform, standing in broad bands in the jaws, on the vomer, the palatine bones, and on the tongue; the vomerine band is angular. The lower pharyngeals are moveable, but united by a ligament into a subtriangular plate, covered with obtusely conical teeth. Branchiostegals five. The base of the vertical fins is scaly. The dorsal spines increase in length posteriorly, the length of the twelfth being less than one-half of that of the head; the membrane behind the spines is notched, and emits a short lobe. The third, fourth and fifth dorsal rays are prolonged into a long lobe, which extends nearly to the end of the caudal; the sixth, seventh and eighth anal spines are prolonged into a similar lobe. Caudal rounded, very elongate, nearly one-fourth of the total. Pectoral with the seventh and eighth rays longest, shorter than the head. The first ventral ray bifid, much longer than the head, and extending beyond the origin of the anal. Scales ctenoid: they are small on the cheek, where they form thirteen transverse series between the angle of the mouth and the posterior præopercular limb; the operculum is covered with the largest scales, which form there only three transverse series; nape of the neck with small scales.

The ground-colour of the body is now whitish, each scale having a dark spot at its base; the body is crossed by four black bands, broader than the ground-colour between, and becoming paler towards the belly: the anterior descends from the origin of the dorsal fin, the posterior from its end. The head is dark brown, with some indistinct black vertical streaks; pectorals yellow, the other fins black.

	inches.	lines.
Total length	9	4
Height of the body	2	3
Length of the head	2	5
Diameter of the eye	0	7
Length of the twelfth dorsal spine	1	0½
——— of the caudal fin	2	6
——— of the pectoral fin	2	1
——— of the ventral fin	3	0

The locality in which this splendid species was found is unknown; I conclude, however, from its general appearance that it belonged originally to a Collection made at the Norfolk Islands.

2. TRACHINOPS.

Body compressed, elongate, covered with rather small, not ciliated scales. Mouth not protractile. Dorsal and anal fins long, the former with fourteen, the latter with three spines. Ventral composed of one spine and four rays, which are not elongate. Teeth in the jaws, on the vomer and the palatine bones; none of the bones of the head serrated. Five branchiostegals; gills three and a half, pseudobranchiæ; the gill-membranes are not united below the throat.

Carnivorous fishes from the coasts of Australia.

1. Trachinops tæniatus.

D. $\frac{14}{16}$. A. $\frac{3}{20}$. L. lat. 62.

Back brownish-black, with a white band running on each side of the base of the dorsal fin.

a. Adult. Australia.
b, c. Young. New South Wales. Presented by J. B. Bennett, Esq.

Description.—The head and body are compressed; the latter is not much lower posteriorly than anteriorly, its greatest depth being one-sixth of the total length (the caudal fin not included). The length of the head is one-fifth of the distance between snout and base of the caudal. The interorbital space is convex, and its width is less than that of the orbit, which is one-fourth of the length of the head. The snout is obtuse and shorter than the eye; the cleft of the mouth is oblique, rather wide, the maxillary extending beyond the centre of the eye. The lower jaw is somewhat longer than the upper. The teeth are small, cardiform, in narrow bands; each jaw has two or three larger ones anteriorly on each side. Gill-opening wide, the gill-membranes not being united or attached to the isthmus; opercles scaly.

The pectoral fin is considerably shorter than the head: the ventral is still shorter, and inserted immediately below its root; its spine is very distinct and pungent. The dorsal fin is continuous, anteriorly low, gradually becoming higher posteriorly, but always lower than the body; it commences above the root of the pectoral and terminates at some distance from the caudal; its spines are stiff. The anal is similar in form to the soft dorsal; the first spine is the shortest, the third the longest. The caudal is pointed, and its middle rays are produced into a filament as long as the fin itself. Young specimens have the caudal simply rounded.

The lateral line runs immediately below the base of the dorsal fin, and is interrupted below its end; the posterior portion runs along the middle of the tail.

The upper half of the fish, the dorsal and anal fins are brownish-black, the lower whitish; a white band, commencing above the orbit, runs along the upper part of the back and passes on the base of the soft portion of the dorsal fin; the black colour of the side of the back is continued as a band over the middle of the caudal fin and its filaments, leaving the upper and lower parts of the fin whitish.

Total length forty-two lines.

Second Group. NANDINA.

3. BADIS.

Badis, *Bleek. Verhand. Batav. Genootsch.* xxv., *Bengal. en Hindost.* p. 106.

Body compressed, oblong, covered with ciliated scales, of moderate size; lateral line interrupted. Mouth very protractile. One dorsal, with fourteen to seventeen spines, the spinous portion being much longer than the soft; anal with three spines, and with the soft portion similar to the soft dorsal. Small teeth in the jaws, on the vomer, the palatine and pterygoid bones; none on the tongue. None of the bones of the head serrated. Six branchiostegals.

Fresh waters of Bengal.

1. Badis buchanani.

Labrus badis, *Buch. Ham. Fish. Gang.* pp. 70, 368. tab. 25. fig. 23.
Badis buchanani, *Bleek. l. c.* tab. 2. fig. 3.

D. $\frac{16-17}{8-7}$. A. $\frac{3}{6-7}$. L. lat. 28.

Greenish, with darker transverse streaks.

Ganges and tributaries.

a. Young. India. Presented by General Hardwicke.

2. Badis dario.

Labrus dario, *Buch. Ham. Fish. Gang.* p. 72.

D. $\frac{14}{8}$. A. $\frac{3}{7}$.

Silvery with black transverse bands, or entirely blackish. (Lateral line none?) (*Buch.*)

Ponds and rivers of the northern parts of Bengal and Behar.

4. NANDUS.

Nandus, *Cuv. & Val.* viii. p. 481; *Bleek. Blitong,* p. 91.
Bedula, *Gray, Illustr. Ind. Zool.*

Body compressed, rather short; mouth very protractile. One dorsal, with thirteen or fourteen spines. Villiform teeth in the jaws, on the vomer, the palatine and pterygoid bones, and on the tongue. Præoperculum serrated; operculum with one spine; præorbital entire. Six branchiostegals; pseudobranchiæ none (in the species examined). Air-bladder simple and large. Pyloric appendages none.

Fresh waters of the Indian region.

1. Nandus marmoratus.

Coius nandus, *Buch. Ham. Fish. Gang.* p. 96. pl. 30. fig. 32.
Nandus marmoratus, *Cuv. & Val.* viii. p. 482. pl. 207; *Cant. Catal.*

p. 17; *Bleek. Verhand. Batav. Genootsch.* xxv., *Bengal. en Hindost.* p. 107.

Bedula hamiltonii, *Gray, Ill. Ind. Zool.* pl. . fig. 3.

D. $\frac{13}{12}$. A. $\frac{3}{7}$. L. lat. 55. L. transv. 7/17. Vert. 24.

The upper maxillary reaches beyond the vertical from the posterior margin of the eye. Brownish-green, marbled with darker.

Fresh waters of Bengal and of some of the islands.

a. Large specimen: stuffed. India. Presented by the Zoological Society.
b. Half-grown. Moluccas. From Mr. Frank's Collection.
c. Half-grown. India. Presented by G. R. Waterhouse, Esq.
d. Adult. India. Presented by General Hardwicke.
e. Young: not good state. India. Presented by G. R. Waterhouse, Esq.

2. Nandus nebulosus.

? Bedula nebulosa, *Gray, Ill. Ind. Zool.* ii. pl. . fig. 2.
Nandus nebulosus, *Bleek. Blitong,* p. 92.

D. $\frac{14}{11}$. A. $\frac{3}{5}$. L. lat. 30.

The upper maxillary does not reach to the vertical from the posterior margin of the eye. Brown, with lighter transverse bands. (*Bl.*)

Rivers of Blitong, Banka, and Borneo.

5. CATOPRA.

Catopra, *Bleeker, Borneo,* iii. p. 65.

Body compressed, rather short; mouth protractile. One dorsal, with thirteen or fourteen spines. Villiform teeth in the jaws, on the vomer, the palatine and pterygoid bones, and on the tongue. Præoperculum and præorbital serrated; operculum with two flat points. Six branchiostegals; pseudobranchiæ?

Fresh waters of the islands of the East Indian Archipelago.

1. Catopra fasciata.

Bleeker, Borneo, iii. p. 65.

D. $\frac{13}{16}$. A. $\frac{3}{8}$. L. lat. 25. L. transv. 13.

The height of the body is twice and three-quarters in the total length. Snout convex, shorter than the diameter of the eye. Denticulations of the præorbital very distinct. Green, with twelve narrow blackish cross-bands. (*Bl.*)

Rivers of Borneo, Sumatra, and Banka.

2. Catopra nandoides.

Bleeker, Natuurk. Tydschr. Nederl. Ind. 1851, pp. 61 & 172.

D. $\frac{14}{16}$. A. $\frac{3}{8}$. L. lat. 25. L. transv. 16.

The height of the body is twice and a half in the total length.

Snout equal in length to the diameter of the eye, not convex. Denticulations of the præorbital very distinct. Uniform greenish-olive. (*Bl.*)

Rivers of Java and Sumatra.

3. **Catopra grootii.**

Bleeker, Blitong, p. 90.

D. $\frac{13}{16}$. A. $\frac{3}{9}$. L. lat. 30. L. transv. 15.

The height of the body is twice and three-quarters in the total length. Snout convex, equal in length to the diameter of the eye. Denticulations of the præorbital scarcely visible. Uniform greenish-olive. (*Bl.*)

Rivers of Blitong and Banka.

Third Group. ACHARNINA.

6. ACHARNES.

Acharnes, *Müll. & Trosch. in Schomb. Reis. Brit. Guyana*, iii. p. 622, and *Hor. Ichthyol.* iii. p. 27.

Body compressed, oblong, covered with small scales. Mouth protractile. Bands of small teeth in the jaws; none on the palate. Bones of the head not armed. The dorsal fin is notched, its spinous portion being of rather greater extent than the soft, and composed of sixteen spines; the anal fin with three spines, and with the soft portion similar to the soft dorsal fin; ventrals thoracic, composed of one spine and five rays. Lateral line interrupted. Five branchiostegals; pseudobranchiæ hidden, four gills; an air-bladder.

Fresh waters of British Guiana.

1. **Acharnes speciosus.**

Müll. & Trosch. l. c., and *Hor. Ichthyol.* iii. taf. 5. fig. 3.

D. $\frac{16}{16}$. A. $\frac{3}{11}$. L. lat. 95.

Brownish, with a black stripe along the middle of the caudal fin. (*M. & T.*)

Mouth of the Essequibo.

Fam. 34. POLYCENTRIDÆ.

Body compressed, elevated, covered with scales. Lateral line none. Dorsal and anal fins long, both with numerous spines, the spinous portion being the more developed. Ventrals thoracic, composed of one spine and five rays. Teeth feeble. Gills three or four; pseudobranchiæ hidden; no superbranchial organ.

Carnivorous fishes from the fresh waters of Tropical America.

Synopsis of the Genera.

Mandible without barbel	1. Polycentrus.
Mandible with a barbel...............................	2. Monocirrhus.

1. POLYCENTRUS.

Polycentrus, *Müll. & Trosch. in Schomb. Reis. Brit. Guyana*, iii. p. 622, and *Horæ Ichthyol.* iii. p. 25; *Gill, Ann. Lyc. New York*, 1858, p. 371.

Body compressed, elevated, covered with ciliated scales of moderate size. Mouth very protractile. Small teeth in the jaws and on the palate. Præorbital and præoperculum serrated; barbel none. Dorsal and anal fins with numerous spines; ventrals thoracic, composed of one spine and five rays. Lateral line none. Six branchiostegals; the gill-membranes not united; gills four; pseudobranchiæ hidden.

Fresh waters of Tropical America.

In deference to the opinion of the authors of the *Horæ Ichthyologicæ*, we formerly placed this genus in our family of *Pristipomatidæ* (vol. i. p. 396). Gill has indicated for it a separate subfamily of *Sciænidæ*, which he calls *Polycentrinæ*. It is evident, however, that this genus, together with other American fishes, forms a separate division, intermediate between the true Acanthopterygians and the Pharyngognaths, and allied to the *Nandidæ* and *Labyrinthici*.

1. Polycentrus schomburgkii.

Müll. & Trosch. l. c., and *Hor. Ichthyol.* iii. taf. 5. fig. 2.

D. $\frac{16-17}{8-7}$. A. $\frac{13}{7}$. L. lat. 29. L. transv. 14.

The height of the body is two-fifths of the total length, the length of the head one-third; the diameter of the eye equals the width of the interorbital space, and is one-fourth of the length of the head (in adult specimens); the maxillary extends beyond the vertical from the middle of the eye. Præoperculum with seven series of scales. The first ventral ray produced. Brownish-olive, irregularly spotted with brown, and with scattered silvery spots; an oblique brown streak from the eye to the angle of the præoperculum. The spinous portions of the vertical fins and the ventrals dark brown, the soft portions and the pectorals whitish. A small patch of teeth on each side of the vomer, and a narrow band on the palatine bones.

Essequibo.

a. Fine specimen, three inches and a half long. Presented by Sir R. Schomburgk.

Müller and Troschel examined a young specimen of this species: hence the discrepancies between our description and theirs.

2. Polycentrus tricolor.

Gill, l. c. p. 373.

D. $\frac{18}{7}$. A. $\frac{14}{7}$.

Light brown, longitudinally striped with darker; head and vertical fins with black dots. (*Gill.*)

Trinidad.

Gill does not make mention of palatine teeth in this species.

2. MONOCIRRHUS.

Monocirrhus, *Heckel, Ann. Wien. Mus.* ii. 1840, p. 439.

The body is compressed, elevated, covered with rough scales; the mouth is very protractile. Villiform teeth in the jaws; none on the vomer. The lower lip prolonged into a fleshy barbel. Præorbital and præoperculum not serrated. Lateral line none. One dorsal, with seventeen spines, the anal with thirteen; none of the rays branched; ventrals thoracic, composed of one spine and five rays. Six branchiostegals; the gill-membranes not united. Three gills; pseudobranchiæ hidden.

Fresh waters of Brazil.

1. Monocirrhus polyacanthus.

Heckel, l. c.

D. $\frac{17}{12}$. A. $\frac{13}{12}$. V. 1/5. L. lat. 35. L. transv. 25–26.

Head pointed. Light brown, with three black streaks on the side of the head, radiating from the eye; a dark band from the gill-opening along the lower half of the tail.

Ponds near the Rio Negro. Tributaries of the Amazon.

a. River Cupai, 800 miles from the sea. From Mr. Bates's Collection.

Fam. 35. LABYRINTHICI.

Labyrinthici, part., *Cuv. Règne Anim.*; *Müll. Berl. Abhandl.* 1844, p. 201.
Labyrinthibranchii, part., *Owen, Lect. Comp. Anat.* i. p. 49.
Osphromenoidei, *Bleek. Enum. Spec.* p. xviii.

Body compressed, oblong or elevated, covered with scales of moderate size; head more or less compressed, covered with scales, which are not different from those of the body. Lateral line absent or more or less distinctly interrupted. Teeth small. *Gill-opening rather narrow*, the gill-membranes of both sides joined below the isthmus and scaly; four gills; pseudobranchiæ none, or rudimentary. *A superbranchial organ, composed of thin laminæ*, situated in a cavity above the gills, and based upon the third or upper portion of the first branchial arch. Number of the dorsal and anal spines variable; ventrals thoracic.

Fresh waters of the East Indies and of South Africa.

The fishes of this family are capable of living for some time out of the water, or buried in exsiccated mud; they appear to retain or to collect a small quantity of water in the cavity in which the superbranchial organ is situated. They live on small animals as well as on vegetable substances; and several of the species are capable of being domesticated, and then of being acclimatized in other countries. The species which have been domesticated are subject to great variations, and I strongly suspect that *Macropus* is merely such a domestic variety.

Synopsis of the Genera.

* Teeth on the palate.	
Vomerine and palatine teeth; opercles not serrated	1. Spirobranchus, p. 373.
Vomerine and palatine teeth; opercles serrated.	2. Ctenopoma, p. 373.
Vomerine teeth; palatine teeth none	3. Anabas, p. 374.
** Moveable teeth on the lips.	
Mouth very small, transverse	4. Helostoma, p. 377.
*** Teeth fixed in the jaws; none on the palate.	
Ventrals well developed; thirteen to twenty dorsal or anal spines; caudal rounded	5. Polyacanthus, p. 378.
Caudal forked	6. Macropus, p. 381.
First ventral ray filiform, with three or four small ones in its axil; two to thirteen dorsal, seven to fourteen anal spines	7. Osphromenus, p. 382.
Only one filiform ventral ray	8. Trichogaster, p. 387.
Ventral fins well developed; dorsal fin short, with a few spines or without any pungent spine	9. Betta. p. 388.

1. SPIROBRANCHUS.

Spirobranchus, *Cuv. & Val.* vii. p. 392.

Body compressed, oblong; none of the bones of the head serrated; cleft of the mouth extending below the orbit. Small teeth in the jaws, on the vomer and the palatine bones. Dorsal spines twelve or thirteen, anal spines seven. Ventral fins well developed. None of the fins elongate. Lateral line interrupted. Air-bladder none. Pyloric appendages two; intestines of moderate length.

Fresh waters of the Cape of Good Hope.

1. Spirobranchus capensis.

Cuv. & Val. vii. p. 392. pl. 200; *Cuv. Règne Anim. Ill. Poiss.* pl. 75. fig. 1.

B. 4. D. $\frac{12-13}{8-7}$. A. $\frac{7}{8}$. L. lat. 30. L. transv. 10.

Brownish, with three oblique blackish streaks running from the orbit towards the præoperculum.

Cape of Good Hope.

a. Half-grown.

b–c. Adult: stuffed. Cape of Good Hope. Presented by Sir A. Smith.

2. CTENOPOMA.

Ctenopoma, *Peters in Müll. Arch.* 1846, p. 481.

Body compressed, oblong; operculum, inter- and sub-operculum serrated; cleft of the mouth extending to below the orbit. Small teeth in the jaws, on the vomer and the palatine bones. Dorsal spines seventeen, anal spines ten. Ventral fins composed of one spine and five rays. Lateral line interrupted. Air-bladder simple. Pyloric appendage one.

Fresh waters of Quellimane.

1. Ctenopoma multispine.

Ctenopoma multispinis, *Peters, l. c.* tab. 10. fig. 10–15.
? Anabas scandens, *Bianconi, Spec. Zool. Mos.* p. 270.
Spirobranchus smithii, *Bianconi, l. c.* p. 279. tab. 10.

B. 6. D. $\frac{17}{9}$. A. $\frac{10}{9}$. V. 1/5. Cæc. pylor. 1.

Greenish, spotted with darker.

Pools near Quellimane.

a. Fine specimen. From Professor Peters's Collection.

Bianconi states that there are only six soft rays in the anal fin, which is probably an error. We can scarcely believe that *Anabas scandens* occurs in Mozambique: Bianconi's specimens having been purchased, some Indian fishes may have been mixed with them; or, which is more probable, the same specimens which Bianconi formerly called *A. scandens*, he may afterwards have determined as *Spirobranchus smithii*,—the last error with regard to generic denomination being greater than the first. I may here also mention that *Megalepis Alessandrini* of the same author is *Upeneoides vittatus*, in which the barbels have been overlooked!

3. ANABAS*.

Anabas, *Cuv. Règne Anim.*

Body compressed, oblong; præorbital and opercles serrated; cleft of the mouth extending to, or below, the orbit. Small teeth in the jaws, on the head of the vomer and on its posterior portion; none on the palatine bones. Dorsal spines numerous (sixteen to nineteen); anal spines in moderate number (nine to eleven); ventral fins composed of one spine and five rays: none of the fins elongate. Lateral line interrupted. Branchial arches with toothed tubercles. Air-bladder bifid posteriorly, each lateral portion extending nearly to the end of the tail. Pyloric appendages in small number. Intestine of moderate length.

Freshwater fishes of Tropical India: said to be able to ascend trees.

It is extremely difficult to distinguish the different species of this genus.

1. The most reliable of the characters is the difference in the number of the scales of the lateral line, which, small as it is, is found constant in all the individuals of the same species. Therefore *Anabas oligolepis*, Bleck., from Borneo, or the Ceylonese *Anabas*, if it be a species distinct from the former, is different from *A. scandens*.

2. Much more questionable are the characters taken from the form of the body. Not only is the body more elevated in young individuals than in adult ones, but also in those which had a full supply of food at the time they were caught; there are specimens in the British Museum which by their lean appearance show that they had fasted for some time, and these have the body elongated, like Bleeker's *A. macrocephalus*, although they certainly belong to the true *A. scandens*.

3. The degree in which the delicate laminæ composing the superbranchial organ are developed is dependent on age. It is not improbable that this organ, in its highest perfection, is somewhat more developed in one species than in the other; but young individuals always show it less complicated than half-grown ones of the same species, and these, again, less than old ones†. I have arrived at this conclusion after the examination of more than twenty individuals: having, however, a *complete* series only of *A. scandens*, I restrict myself to a description of the development of this organ in that species.

The superbranchial organ is formed by several exceedingly thin bony laminæ, similar in form to the auricle, and concentrically situated one above the other, so that the innermost is the largest. Now, in specimens from one inch and a half to two inches and a half long, there are only two such laminæ, a third being indicated by a small protuberance at the central base of the second or outer lamina. In specimens of from three to four inches in length, the third lamina is developed, covering one-half of the second. The edges of all the laminæ are straight, not valanced[*]. In specimens of from four to five inches, a fourth lamina makes its appearance in the basal centre of the third lamina. The other laminæ continue to grow in their circumference, and their edges now become undulated and slightly valanced. Cuvier and Valenciennes have examined still larger specimens; the figure given by them was taken from a specimen six or seven inches long, and shows the superbranchial organ composed of six laminæ. The connexion of this organ with the gill-apparatus has been examined and fully described by Peters[†].

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* 1. Anabas variegatus, *Bleek. Celebes*, i. p. 220.—North Celebes.

† The same is the case in *Osphromenus olfax*, and probably in all the fishes of this family.

It may be supposed that, as in other fishes, the difference in the size of individuals does not always coincide with a corresponding difference in age; and if, for instance, there should occur specimens four inches in length with the superbranchial organ as complicated as it is generally found to be in the larger ones, it would not form an objection to the facts stated.

1. Anabas scandens.

Willughby, App. p. 4. tab. 4. fig. 4.
Perca scandens, *Daldorff, Trans. Linn. Soc.* iii. p. 62.
Anthias testudineus, *Bl.* t. 322.
Amphiprion testudineus et scansor, *Bl. Schn.* pp. 204, 570.
Lutjanus testudo et scandens, *Lacép.* iv. pp. 235, 239.
Sparus testudineus, *Shaw, Zool.* iv. p. 471.
Cojus cobojius, *Buch. Ham.* pp. 98, 370. pl. 13. fig. 33; *Taylor in Brewster's Edinb. Journ. Sc.* 1831, v. pp. 34, 36.
Anabas testudineus, *Cuv. Règne Anim.*
—— scandens, *Cuv. & Val.* vii. p. 333. pls. 193 & 205; *Cant. Ann. Nat. Hist.* ix. 1842, p. 28, and *Catal.* p. 82; *Cuv. Règne Anim. Ill. Poiss.* p. 74. fig. 1; *Richards. Ichth. China*, p. 250; *Jerdon in Madr. Journ.* xv. p. 144; *Bleek. Verh. Bat. Genootsch.* xxiii. p. 8 (part.), and *Java*, iv. p. 329.
—— spinosus, *Gray, Ind. Zool.* ii. pl. 89. fig. 1.
—— trifoliatus, *Kaup in Wiegm. Arch.* 1860, p. 124. taf. 6. fig. A.

D. $\frac{17-18}{10-9}$. A. $\frac{10-11}{10}$. L. lat. 30–31. L. transv. 15–16.
Cæc. pylor. 3. Vert. 10/16.

The height of the body is contained three times or three times and three-fourths in the total length, the length of the head three times and a half or four times. The præorbital and the opercles are denticulated, the teeth of the angle of the operculum and suboperculum being more or less produced. Greyish-olive: immature specimens with two brown streaks on the side of the head, and with a black spot at the base of the caudal fin. Two spines of the operculum form a notch, the membrane of which is black.

Fresh waters of the East Indies.

a, b. Adult: stuffed. Calcutta. From the Collection of the East India Company.
c–d, e–m. Young. Ganges. Presented by G. R. Waterhouse, Esq.

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[*] This is *A. trifoliatus* of Kaup, founded on the comparison of two specimens with Cuvier's figure (Wiegm. Arch. 1860, p. 124).
[†] Müll. Arch. 1853, p. 427.

n. Adult: stuffed. Mud-fields, River Gogia. Purchased of Captain Boys.
o–q. Adult and half-grown: skins. Pinang. From Dr. Cantor's Collection.
r. Young. Malayan Peninsula. From Dr. Cantor's Collection.
s–u. Adult and half-grown. Khasya. Presented by Dr. J. Hooker.
v. Half-grown. Siam. From M. Mouhot's Collection.
w. Half-grown. Java. Purchased of Mr. Frank.
x. Half-grown. Philippine Islands.
y. Half-grown: stuffed. Presented by Sir A. Smith.
z, *α*, *β–γ*. Adult, half-grown, and young.

2. **Anabas macrocephalus.**

Anabas scandens, *Bleek. Verh. Bat. Gen.* xxiii., *Doolh. K.* p. 8 (part.).
—— macrocephalus, *Bleek. Java*, ii. p. 430.

D. $\frac{17-18}{10-8}$. A. $\frac{9-11}{10-9}$. L. lat. 30–31. L. transv. 15.

The height of the body is contained four times or four times and a third in the total length, the length of the head three times and a half to three times and three-fourths. The præorbital and the opercles are denticulated; the teeth of the angle of the operculum and suboperculum being produced, spine-like. Greenish-olive, with a brown streak from the maxillary to the præoperculum, and with another to the interoperculum. Immature specimens with darker cross-bands, and with a black spot at the base of the caudal fin. Two spines of the operculum form a notch, the membrane of which is black.

Java, Sumatra, Borneo, Bintang, and Philippine Islands.

a. Adult. Philippine Islands.
b–c. Half-grown. From the Haslar Collection.

This species appears to have the margins of the laminæ of the superbranchial organ rather more valanced than *A. scandens*.

3. **Anabas oligolepis.**

? Anabas oligolepis, *Bleeker, Borneo*, viii. p. 161.

D. $\frac{16-18}{8}$. A. $\frac{9-10}{9}$. L. lat. 27. L. transv. 15.

The height of the body is contained three times and a third to three times and a half in the total length, the length of the head three times and three-fourths to four times. The præorbital and the opercles are denticulated; the præoperculum is entire; the teeth at the angle of the operculum and suboperculum are elongate. Greenish, with two brown streaks running from the orbit to the opercles; a blackish spot at the root of the caudal.

? Bandjermassing. Ceylon. China.

a, *b–c*. Adult and half-grown. Point de Galle. Presented by Sir A. Smith.
d. Many fine specimens. Ceylon. Purchased of Mr. Cuming.

e–f. Adult. Ceylon. From the Collection of Messrs. von Schlagintweit.
g–h. Half-grown. China. From Dr. Cantor's Collection.
i. Adult. From the Collection of the Zoological Society.

The Ceylonese *Anabas* has two scales more in a transverse line running from the first anal spine obliquely upwards and forwards, than *A. oligolepis*, Bleek., from Borneo, and therefore it is, for the present, doubtful whether both are identical or not. They agree in other respects, especially in the number of the scales of the lateral line. The largest specimen examined is four inches long; and on comparison with specimens of *A. scandens* of the same size, I find the same number of laminæ, but the first or inner lamina has its lower lobe considerably less developed. There is no young individual in the Collection.

4. Anabas microcephalus.

Bleek. in Act. Soc. Sc. Indo-Nederl. ii., *Amboina*, p. 58.

D. $\frac{19}{8}$. A. $\frac{11}{10}$. L. lat. 31. L. transv. 14–15.

The height of the body is contained four times in the total length, the length of the head four times and a half to four times and three-fifths. The maxillary extends only to below the anterior margin of the orbit. The præorbital and the opercles are denticulated; the teeth of the angle of the operculum and suboperculum being produced. Greenish-olive. (*Bl.*)

Amboyna.

4. HELOSTOMA.

Helostoma, (*K. & v. H.*) *Cuv. & Val.* vii. p. 341.

Body compressed, rather elevated; operculum without spines or serrature; cleft of the mouth very small, transverse, not extending to the orbit; eye on the same level with the angle of the mouth. Minute moveable teeth on the lips; none on the palate. Dorsal and anal spines numerous (15–17); ventral fins composed of one spine and five rays; none of the fins elongate. Lateral line interrupted. Branchial arches without toothed tubercles, lined with a soft vascular membrane. Air-bladder simple; pseudobranchiæ none (glandular). Pyloric appendages in small number; intestine with many circumvolutions, long.

Fresh waters of Java.

1. Helostoma temminckii.

Helostoma temminckii, (*K. & v. H.*) *Cuv. & Val.* vii. p. 342. pl. 194; *Bleek. Verhand. Batav. Genootsch.* xxiii., *Labyr.* p. 9.
—— tambakkan, *Bleek. Topogr. Batav.*
—— oligacanthum, *Bleek. Topogr. Batav.*

D. $\frac{17}{14\text{–}15}$. A. $\frac{15}{17\text{–}18}$. L. lat. 44. L. transv. 8/16. Cæc. pylor. 2. Vert. 14/16.

The height of the body is contained twice and two-thirds in the total length, the length of the head thrice and two-thirds. Inter- and suboperculum minutely denticulated. Greyish, with darker lines along the series of scales.

Java, Sumatra, Borneo.

a. Fine specimen.

According to Dr. v. Bleeker's observation, the number of the dorsal and anal spines appears to be subject to considerable variations.

5. POLYACANTHUS.

Polyacanthus, (*K. & v. H.*) *Cuv. & Val.* vii. p. 353.

Body compressed, oblong; operculum without spines or serrature; cleft of the mouth small, more or less oblique, not extending beyond the vertical from the orbit, and little protractile. Small fixed teeth in the jaws, none on the palate. Dorsal and anal spines numerous (13–20); ventral fins composed of one spine and five well-developed rays; the soft dorsal and anal, the caudal and the ventral more or less elongate in mature specimens. Caudal rounded. Lateral line interrupted or absent. Branchial arches with toothed tubercles. Air-bladder simple; pseudobranchiæ none (glandular). Pyloric appendages in small number; intestine with many circumvolutions.

Fresh waters of the East Indies.

1. Polyacanthus hasselti.

Polyacanthus hasselti, *Cuv. & Val.* vii. p. 353. pls. 195, 205; *Cuv. Règne Anim. Ill. Poiss.* pl. 72. fig. 1; *Bleek. Verhand. Batav. Genootsch.* xxiii. p. 9.
—— kuhlii, *Bleek. Topogr. Batav.*

B. 4. D. $\frac{18\text{–}19}{12\text{–}11}$. A. $\frac{16\text{–}17}{13\text{–}12}$. L. lat. 31–32. L. transv. 7/13.
Cæc. pylor. 2. Vert. 11/16.

The height of the body is nearly one-half of the total length (the caudal fin not included), the length of the head two-sevenths. Lateral line interrupted. Præorbital not serrated. The first soft ray of the ventral fin is produced into two filaments of moderate length. Coloration uniform.

Java, Sumatra, Borneo.

a. Fine specimen.

2. Polyacanthus einthovenii.

Bleeker, Borneo, v. p. 423.

B. 6. D. $\frac{18}{11}$. A. $\frac{16}{12}$. L. lat. 32.

The height of the body is contained twice and three-fourths in the total length, the length of the head three times and three-fourths. Lateral line interrupted. Green, with black vertical stripes; a round black spot on the middle of the base of the soft dorsal fin; caudal membrane dotted with black. (*Bl.*)

Rivers of Sambas (West Borneo). Sumatra.

3. Polyacanthus helfrichii.

Bleeker, Borneo, viii. p. 162.

D. $\frac{18-19}{11}$. A. $\frac{16-17}{12-11}$. L. lat. 32.

The height of the body is two-fifths of the total length (the caudal fin not included), the length of the head two-sevenths. Lateral line subinterrupted. Præorbital not serrated. The first soft ray of the ventral fin is produced into two filaments. Coloration uniform. (*Bl.*)

Rivers of Bandjermassing.

4. Polyacanthus opercularis.

Labrus opercularis, *L. Amœn. Acad.* iv. p. 428; *Bl. Schn.* p. 245.
Chætodon chinensis, *Bl.* taf. 218. fig. 1; *Lacép.* iv. pp. 461, 496; *Bl. Schn.* p. 234.
Polyacanthus chinensis, *Cuv. & Val.* vii. p. 357; *Richards. Ichth. Chin.* p. 250.
Macropodus ocellatus, *Cant. Ann. & Mag. Nat. Hist.* ix. 1842, p. 484.
Polyacanthus (?) opercularis, *Richards. l. c.*
Polyacanthus (?) paludosus, *Richards. l. c.*

D. $\frac{14-17}{8-7}$. A. $\frac{18-20}{11-12}$. L. lat. 30. L. transv. 11–12.

The depth of the body is contained twice and a half or twice and two-thirds in the total length (the caudal fin not included), the length of the head three times. Lateral line none. A round black spot on the extremity of the operculum.

China. Chusan.

Var. *α*. Body and tail uniformly coloured, or with an oblong blackish spot above the anal fin. The soft portions of the vertical fins dotted with greyish (in spirits).

a–b, c. Fine specimens. Hongkong. Presented by Sir J. Bowring.
d, e. Adult. Chusan. Presented by the East India Company.—Types of *M. ocellatus*, Cant.

Var. *β*. Reddish, with irregular silvery transverse streaks.

f–h. Fine specimens. Hongkong. Presented by Sir J. Bowring.

Var. *γ*. Greyish or reddish, with brown transverse bands.

i. Many specimens. China.

There cannot be the slightest doubt that a specimen of this species has served for the wretched sketch to which Sir J. Richardson has given the denomination of *P. paludosus*. The typical specimen was evidently in a bad state of preservation, and the artist has been more careful in representing the markings of the fish than the fin-rays, &c.

5. Polyacanthus signatus.

B. 6. D. $\frac{16-17}{8}$. A. $\frac{14-16}{10}$. L. lat. 29. L. transv. 4/9. Vert. 10/16.

The height of the body is contained twice and a half in the total length (the caudal fin not included), the length of the head twice and three-fourths. Lateral line interrupted. Præorbital serrated. Reddish-olive (in spirits): a round blackish spot on the middle of the base of the soft dorsal; an oblong blackish blotch parallel to, and below, the posterior portion of the lateral line.

Ceylon.

a–b, c, d, e–h, i–k. Adults, half-grown, and young. Ceylon. Purchased of Mr. Cuming.

l. Adult: skeleton. Ceylon. Purchased of Mr. Cuming.

Description.—The head and body are oblong, strongly compressed, the greatest depth being two-fifths of the distance of the snout from the base of the caudal fin. The lower profile of the head ascends in nearly as oblique a line as that in which the upper one descends. The cleft of the mouth is rather small, oblique, the maxillary extending to the vertical from the anterior margin of the orbit; the maxillary is nearly entirely hidden below the præorbital when the mouth is closed. A narrow band of small cardiform teeth in both jaws, those in front being somewhat enlarged. The lower edge of the præorbital is minutely serrated. The interorbital space is slightly convex, its width, in adult specimens, being nearly equal to the diameter of the eye, which is one-fifth of the length of the head, and less than the extent of the snout. Opercles without serrature; there are, however, some very indistinct denticulations at the angle of the præoperculum. The spinous dorsal fin commences in the vertical from the fourth scale of the lateral line; the posterior spines are longer than the anterior ones; the soft dorsal is pointed, the fourth ray being produced into a long filament. This and the other fins are much less produced in young specimens. Caudal elongate, terminating in an obtuse point. The anal fin commences below the fifth dorsal spine; the spines increase in length posteriorly; the sixth soft ray is the longest, and produced into a filament, like the dorsal fin. Pectoral rounded, of moderate length, much shorter than the head. The first ventral ray terminating in two long filaments.

Scales ctenoid. The lateral line is interrupted below the middle of the dorsal fin. Colours as described above.

Total length five inches.

The accessory organ of the gills is contained in a membranaceous sac, transparent, semi-cartilaginous, composed of three lamellæ which diverge from a common centre.

The portion of the tail which is covered by the black blotch is transparent when the fish is held against the light, the air-bladder extending nearly to the caudal fin.

Skeleton.—The crown of the head is convex, with three crests of moderate height; the interorbital space is rather flat, and somewhat narrower than the orbit; there is a narrow groove between the turbinal bones, in which the processes of the intermaxillary move. The extremity of the maxillary is slightly dilated; præorbital longer than wide, the other infraorbitals very narrow; bottom of the tympanic cavity entirely osseous. The limbs of the præoperculum are nearly of equal length and meet at a right angle; the lower is slightly curved. There are ten abdominal and sixteen caudal *vertebræ*, the length of the former portion of the vertebral column being to that of the caudal as 1 : 1·4. The vertebræ are compressed, as high as long; neurals, hæmals, and the interneurals and interhæmals of the spinous portions of the fins of moderate length and strength; the hæmals are longer than the neurals; the first interhæmal and hæmal form together a strong curved bone, as in *Osphromenus*; the five following interhæmals are received between the two bones mentioned. Ribs well developed, with epipleurals.

6. **Polyacanthus cupanus.**

Cuv. & Val. vii. p. 357.

$D. \frac{14}{5}. \quad A. \frac{19}{11}.$

Brownish-grey, with a small black spot on each side of the root of the caudal fin. Caudal rays dotted with black. (*Cuv.*)

River Arian-Coupang (Pondicherry).

7. **Polyacanthus deissneri.**

Osphromenus deissneri, *Bleeker, Natuurk. Tydschr. Nederl. Ind.* xviii. 1859, p. 376.

$D. \frac{13}{6}. \quad A. \frac{13}{8}. \quad L. lat. 30.$

The height of the body is contained thrice and three-fifths in the total length (the caudal fin not included), the length of the head thrice and one-fifth. Præorbital indistinctly denticulated. The upper profile of the snout is oblique, straight. Lateral line inconspicuous. Rose-coloured: a black band along the dorsal and ventral lines; two black longitudinal bands on each side; the lower part of the side of the head black-spotted; dorsal, anal, and ventral fins reticulated with black. (*Bl.*)

Rivers of Baturussak (Island of Bawean).

6. MACROPUS.

Macropodus, *Lacép.* iii. p. 417.

Body compressed, oblong; operculum without spine or serrature; cleft of the mouth rather small, not extending beyond the vertical from the orbit. Small fixed teeth in the jaws, none on the palate. Dorsal and anal spines numerous (13–18); ventral fins composed of one spine and five rays, which are well developed; the soft dorsal and anal, the caudal and ventral elongate. Caudal forked. Lateral line absent. Branchial arches with toothed tubercles. Air-bladder? Pyloric appendages in small number; intestine of moderate length.

Fresh waters of China and Cochinchina.

This may prove to be a domestic variety of a species of *Polyacanthus*.

1. Macropus viridi-auratus.

Macropodus viridi-auratus, *Lacép.* iii. p. 417. pl. 16. fig. 1; *Cuv. & Val.* vii. p. 373; *Cuv. Règne Anim. Ill. Poiss.* pl. 74. fig. 2.
—— venustus, *Cuv. & Val.* vii. p. 375. pl. 197.

B. 4. D. $\frac{13}{6\text{–}7}$. A. $\frac{17\text{–}18}{15}$*. Cæc. pylor. 2. Vert. 9/18.

Minute denticulations at the præorbital and at the angle of the præoperculum. Body with some obscure cross-bands.

China. Cochinchina.

7. OSPHROMENUS.

Osphronemus, (*Commers.*) *Lacép.* iii. p. 117; *Cuv. & Val.* vii. p. 377.
Trichopus, *Lacép.* iii. p. 129; *Cuv. & Val.* vii. p. 388.

Body compressed, more or less elevated; operculum without spine or serrature; cleft of the mouth small, oblique, protractile. Small fixed teeth in the jaws, none on the palate. Dorsal spines in small or moderate number (2–13), anal spines in moderate or great number (7–14); ventral fins with the outer ray very long, filiform, the other three or four being small and rudimentary (except in *O. striatus*). Lateral line not interrupted or absent. Air-bladder present; pyloric appendages two.

Fresh waters of the East Indies.

1. Osphromenus olfax.

Osphronemus gourami, *Lacép.* iii. p. 117. pl. 3. fig. 2.
Trichopodus mentum, *Lacép.* iii. p. 125. pl. 3. fig. 3.
Trichopus goramy, *Shaw, Zool.* iv. p. 388. pl. 55.
—— satyrus, *Shaw, Zool.* iv. p. 391. pl. 35.
Osphronemus olfax, (*Commers.*) *Hardw. Zool. Journ.* iv. p. 309. pl. 36. suppl.; *Cuv. & Val.* vii. p. 377; *Richards. Ichth. Chin.* p. 251; *Bleek. Verh. Bat. Genootsch.* xxiii. p. 10; *Cant. Catal.* p. 88.
—— gourami, *Cuv. & Val.* vii. p. 377. pl. 198 (half-grown); *Cuv. Règne Anim. Ill. Poiss.* pl. 73. fig. 1 (young).
—— satyrus, *Bleek. Topogr. Batav.* (adult).
Superbranchial organ: *Cuv. & Val.* pl. 206 (adult); *Peters in Müll. Arch.* 1853, taf. 13. fig. A. (immature).

B. 6. D. $\frac{11\text{–}13}{11\text{–}12}$. A. $\frac{9\text{–}12}{19\text{–}21}$. L. lat. 30–33. L. transv. 5/13.
Cæc. pylor. 2. Vert. 12/18–19.

The height of the body is contained twice in the total length (the caudal fin not included), the length of the head twice and a half in young specimens, or thrice and a quarter in adult ones. Præorbital denticulated. The upper profile of the snout is concave. *Adult* specimens uniformly coloured; *young* ones with seven or nine oblique blackish bands; a black spot at the root of the pectorals, and another in the penultimate lateral band, a little in front of the end of the anal fin.

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* The formula of these fins is given by Valenciennes twice (p. 373) as it is stated above, and once (p. 374) as follows: D. $\frac{12}{15}$. A. $\frac{17}{7}$.

Fresh waters of Java, Madura, Sumatra, and Borneo. Naturalized in Pinang, Malacca, Mauritius, and Cayenne.

a–c. Adult and half-grown: skins. Pinang. From Dr. Cantor's Collection.
d. Young. Malayan Peninsula. From Dr. Cantor's Collection.
e, f. Half-grown and young: skins. East Indies.
g. Half-grown. East Indies.
h–m. Half-grown and young. Mauritius. From the Collection of the Zoological Society.
n, o–p, q. Half-grown and young.
r. Half-grown: skeleton. Purchased.

Skeleton.—The upper surface of the skull, the interorbital space included, is rather broad and convex; occipital crest elevated, lateral crests moderately developed; there is a broad and deep groove extending on between the orbits, in which the processes of the intermaxillary move; the turbinal bones are elongate, and situated on each side of that groove. The posterior processes of the intermaxillary are longer than the descending branches of the bone, or than the maxillary, which is very slightly dilated at its extremity; præorbital triangular, infraorbital ring very narrow. The bottom of the tympanic cavity is entirely osseous. The limbs of the præoperculum are of equal length, and meet at a right angle, the edge of the lower limb being slightly curved; operculum higher than long. Coracoid straight, long; there is a wide cleft between ulna and humerus; carpal bones short; pubic bones narrow, slender, firmly attached to each other, each being composed of three lamellæ.

There are nineteen abdominal and twenty-eight caudal *vertebræ*, the length of the former portion of the vertebral column being to that of the caudal as 1 : 1·5. The vertebræ are short, slightly compressed, elevated. The hæmals and interhæmals are considerably longer than the neurals and interneurals. There are seven spurious interneurals between the occiput and the dorsal fin; one interhæmal and interneural always correspond to a hæmal and neural. The first hæmal is very long and strong: the first interhæmal is curved, and fixed to the middle of the hæmal, so that a space remains between the lower end of the hæmal and the upper of the interhæmal; this space is filled up by five interhæmals intercalated between the two bones: the second hæmal is firmly united with the first: the last hæmal is continuous with the fan-like expansion of the last vertebra. Ribs moderately developed.

	lines.
Length of the fifth, twelfth, and twenty-sixth vertebræ	1½
——— of the abdominal portion	18½
——— of the caudal portion	28
——— of the first hæmal spine	19

2. Osphromenus trichopterus.

Sparus, *Koelreuter, Nov. Comm. Petrop.* ix. p. 452. pl. 9. fig. 1.
Labrus trichopterus, *Pall. Spicil.* viii. p. 45; *L. Gm.* p. 1286; *Bloch*, tab. 295. fig. 2.
Trichogaster trichopterus, *Bl. Schn.* p. 165.
Trichopus trichopterus, *Lacép.* iii. p. 129; *Cuv. & Val.* vii. p. 388. pl. 199; *Bleek. Verhand. Batav. Genootsch.* xxiii. p. 10; *Cantor, Catal.* p. 89. pl. 2. fig. 5 (head).
—— pallasii, *Shaw, Zool.* iv. p. 392.
—— leerii, *Bleek. Sumatra*, i. p. 577.

D. $\frac{5-7}{9-10}$. A. $\frac{10-14}{28-34}$. L. lat. 44–46. L. transv. 20–25. Cæc. pylor. 2.

The height of the body is two-fifths or one-third of the total length (without caudal).

Var. *a. koelreuteri* (Cuv. & Val. pl. 199).

A round black spot on the middle of the side, another on the root of the caudal fin; head and body with more or less regular brown cross-bands. The depth of the body is two-fifths of the total length (the caudal not included).

Java.

a, b, c–e. Adult and half-grown.
f. Adult: discoloured.

Var. *β. cantoris* (Cant. Catal.).

The two black spots are united by a longitudinal zigzag band running from the mouth through the eye to the caudal fin; caudal white-spotted. The height of the body is two-fifths or three-sevenths of the total length (the caudal not included).

Pinang. Malayan Peninsula.

g. Adult: skin. Pinang. From Dr. Cantor's Collection.

Var. *γ. leerii* (Bleek. *l. c.*).

A black band runs from the mouth through the eye to the caudal fin; vertical fins with white, brown-edged ocelli; (in preserved specimens the ocelli are less distinct than the brown edges). The height of the body is contained thrice and three-fifths in the total length (the caudal included).

Pinang. Sumatra and Borneo.

h. Adult. Pinang. From Dr. Cantor's Collection.

We have not had an opportunity of examining *Ctenops nobilis*, M'Clell. Calc. Journ. Nat. Hist. v. p. 281. pl. 21. fig. 1. Cantor says, "A second species of *Trichopodus* has been discovered by Mr. Campbell, Superintendent of Darjeeling, in the rivers at the Sikkim passes, on the northern frontier of Bengal. An incorrect and defective description and figure have been published by Mr. M'Clelland, who, imagining that the fish belonged to the family of *Chætodontidæ*, and the genus to be new, denominated it *Ctenops nobilis*."

3. Osphromenus siamensis.

D. $\frac{7}{8}$. A. $\frac{11-12}{33-35}$. L. lat. 42. L. transv. 12/16.

The height of the body is one-half of the total length (the caudal fin not included).

Fresh waters of Siam.

a–e. Fine specimens. From M. Mouhot's Collection.

Description.—When we take the origin of the dorsal fin as the highest point of the upper profile, and the base of the last dorsal spine as the lowest of the abdomen, the depth between these two points is one-half of the total length (the caudal not included). The length of the head is three times and two-thirds in the same length. The snout is broader than long, equal to the diameter of the eye, which is one-fourth of the length of the head. The interorbital space is convex, wider than the orbit. Mouth very small, rather protractile; præorbital with its extremity truncated and serrated; angle of the præoperculum serrated; there are two or three series of scales between the eye and the angle of the præoperculum. The dorsal fin commences nearer to the root of the caudal than to the end of the snout; it has six strong spines, which increase in length posteriorly, the last being longer than one-half the length of the head. Caudal emarginate; the anal is nearly entirely scaly, and terminates immediately before the caudal. The longest ventral ray extends beyond the extremity of the caudal, and has three or four rudimentary rays in its axil.

The colour is greenish on the back, silvery on the sides and on the belly. A black spot on the middle of the body in the vertical from the origin of the dorsal, below the lateral line; a second on the middle of the root of the caudal. The soft dorsal and caudal with brown dots; anal yellowish, with lighter spots, and sometimes with brownish dots.

This description is taken from specimens which are from three to four inches long.

4. Osphromenus microlepis.

D. $\frac{3}{10}$. A. $\frac{10}{39}$. L. lat. 60. L. transv. 12/22.

The height of the body is one-half the total length (the caudal fin not included).

Fresh waters of Cambojia.

a. Fine specimen. From M. Mouhot's Collection.

Description of the specimen.—The height of the body is one-half of the total length (without caudal), the length of the head two-sevenths; the profile of the nape is convex, that of the head rather concave. The snout is somewhat depressed, broader than long, with the lower jaw prominent; the interorbital space is convex, nearly twice as wide as the orbit, the diameter of which is one-fifth of the length of the head, and less than that of the snout. Præorbital triangular, with the lower margin serrated; there are five series of scales between the orbit and the angle of the præoperculum. The entire lower margin of the præoperculum and a part of the sub- and interoperculum are serrated. The dorsal fin commences on the middle of the distance between the snout and the root of the caudal; its spines are moderately strong, the length of the third being more than one-half of that of the head. Caudal emarginate: more than one-half of the anal fin is scaly; it terminates immediately before the caudal. The longest ventral ray extends beyond the extremity of the caudal, and has three rudimentary rays in its axil. Immaculate: back greenish, sides and belly silvery; the soft dorsal and caudal with brownish dots.

Total length six inches.

5. Osphromenus striatus.

? Osphronemus vittatus, (*Kuhl & v. Hass.*) *Cuv. & Val.* vii. p. 387.
Trichopus striatus, *Bleek. Verhand. Batav. Genootsch.* xxiii., *Labr.* p. 11, and *Natuurk. Tydschr. Nederl. Ind.* 1850, i. p. 106.

D. $\frac{2-4}{6-8}$. A. $\frac{6-8}{24-26}$. L. lat. 28–30. L. transv. 13.

The height of the body equals the length of the head, and is one-third of the total (the caudal not included).

Var. *α*.

Body with two brown longitudinal bands.—Java.

Var. *β*.

Body with four black longitudinal bands.—Borneo.

Var. *γ*.

Three blackish bands on each side, the upper with a round spot.—Fresh waters of Siam.

a–b. Fine specimens. From M. Mouhot's Collection.

Description.—Head longer than high; snout of moderate length, longer than the diameter of the eye, which is one-fourth of the length of the head; cleft of the mouth rather small, with the lower jaw slightly prominent; both jaws with a band of villiform teeth; the interorbital space is slightly convex, and as wide as the orbit. Præorbital and angle of the præoperculum serrated. There are three series of scales between the orbit and the angle of the præoperculum. The distance of the first dorsal spine from the root of the caudal is only one-half of its distance from the snout; the spines are rather feeble, the length of the third being one-third of that of the head. The soft dorsal is much produced, like the caudal and the posterior part of the anal. Caudal rounded, not forked, one-third of the total length. Base of the anal scaly. The spine of the ventral is rather strong, and its outer ray is produced into a long filament; the other rays are well developed.

There are three blackish longitudinal bands on each side: the upper runs from the upper margin of the orbit to the upper part of the root of the caudal; it is dilated into a round black spot behind the shoulder, and there is another smaller spot on its extremity; the second runs from the snout through the eye to the caudal; and finally, the third from the angle of the mouth, across the cheek, through the lower part of the base of the pectoral to the root of the last caudal rays, where it terminates in a round black spot. The membrane of the vertical fins is dotted all over with black.

This must be a beautiful species during life. It is intermediate between *Osphromenus* and those species for which the genus *Betta* has been created; it also approaches *Macropus* in the fin-rays, which are much prolonged.

	lines.
Total length	27
Length of the head	6
Height of the body	6
Length of the caudal	9

8. TRICHOGASTER*.

Trichogaster, sp., *Bl. Schn.* p. 164.
Colisa, *Cuv. & Val.* vii. p. 359.

Body compressed, oblong; operculum without spine or serrature; cleft of the mouth small, oblique, little protractile. Small fixed teeth in the jaws, none on the palate. Dorsal and anal spines numerous (14–18); ventral fins reduced to a single long filiform ray. Lateral line interrupted or absent. Branchial arches with toothed tubercles. Air-bladder divided into two portions posteriorly, situated on both sides of the caudal vertebræ. Pyloric appendages in small number; intestine with many circumvolutions.

Fresh waters of Bengal and Hindostan.

1. Trichogaster fasciatus.

Trichogaster fasciatus, *Bl. Schn.* p. 164. tab. 36.
Trichopodus colisa, *Buch. Ham. Fish. Gang.* pp. 117, 372. pl. 15. fig. 40; *Taylor in Brewster's Edinb. Journ. Sc.* 1831, v. pp. 34, 37.
—— bejeus, *Buch. Ham. l. c.* pp. 118, 372.
—— cotra, *Buch. Ham. l. c.* pp. 119, 372.
—— lalius, *Buch. Ham. l. c.* pp. 120, 372.
Colisa vulgaris, *Cuv. & Val.* vii. p. 362. pls. 196, 205.
—— bejeus, *Cuv. & Val.* vii. p. 365.
—— cotra, *Cuv. & Val.* vii. p. 366.
—— lalius, *Cuv. & Val.* vii. p. 366.
—— ponticeriana, *Cuv. & Val.* vii. p. 370.

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* 1. Trichopodus sota, *Buch. Ham. Fish. Gang.* p. 120.—Colisa sota, *Cuv. & Val.* vii. p. 367.—Ganges.
2. —— chuna, *Buch. Ham. l. c.* p. 121.—Colisa chuna, *Cuv. & Val.* vii. p. 368.—Ganges.

Polyacanthus fasciatus, *Cuv. & Val.* vii. p. 369.
Colisa vulgaris, *Bleek. Verhand. Batav. Gen.* xxv., *Beng. en Hindost.* p. 94.

D. $\frac{14-17}{8-12}$ (23–28). A. $\frac{15-18}{13-18}$ (29–33). L. lat. 30–31. L. transv. 5/10. Cæc. pylor. 2. Vert. 8/17.

Præorbital serrated; caudal fin subtruncated. Body with about twelve oblique dark cross-bands; dorsal and caudal fins with reddish, yellowish, or blackish spots; immature specimens with a black spot on the root of the caudal fin.

Bengal and Hindostan.

a–b, c–d, e, f–h, i–l, m–t, u. Adult, half-grown, and young. East Indies.
v. Adult: very bad state. Calcutta. From the Collection of Messrs. v. Schlagintweit.
w. Adult: stuffed. Calcutta. From Mr. Blyth's Collection.
x, y. Adult: stuffed. Presented by Sir A. Smith.

2. Trichogaster unicolor.

Colisa unicolor, *Cuv. & Val.* vii. p. 368.

D. $\frac{15}{6}$. A. $\frac{14}{12}$.

Præorbital not denticulated. Caudal fin rounded. Coloration uniform. (*Cuv.*)

Estuaries near Calcutta.

9. BETTA.

Betta, *Bleek. Verhand. Batav. Genootsch.* xxiii., *Labyrinth.* p. 12, and *Midden- en Oost-Java,* p. 14.

Body compressed, oblong; operculum without spine or serrature. Small fixed teeth in the jaws, none on the palate. Dorsal fin short, on the middle of the back, without any pungent spine; anal fin long. Ventral fin with five soft rays, the outer one being produced. Lateral line interrupted or absent. Air-bladder and pyloric appendages none (*B. pugnax*).

Fresh waters of the East Indies.

1. Betta trifasciata.

Bleek. l. c.

B. 6. D. $\frac{1}{7}$. A. $\frac{1}{20}$. L. lat. 26.

Lateral line inconspicuous. Three black bands from the operculum to the caudal fin. (*Bl.*)

Ambarawa (Central Java), 1500 feet above the sea. Sumatra. Banka. Biliton.

2. Betta pugnax.

Macropodus pugnax, *Cant. Catal.* p. 84. pl. 2. figs. 1–4.
Betta anabatoides, *Bleek. Borneo*, ii. p. 269.
Pla Kat *of the Siamese.*

B. 6. D. 9–10. A. 27–28. L. lat. 32. L. transv. 10.
Cæc. pylor. 0. Vert. 10/18.

Lateral line inconspicuous. Body with blackish cross-bars and silvery longitudinal streaks; two or three black bands on the side of the head, the upper one running through the eye.

Var. Head and body with two black longitudinal bands, one running from the muzzle through the eye to the root of the caudal fin.

Dried specimens uniform brownish.

Pinang. Malayan Peninsula. East Indian Archipelago.

a. Fine specimen. Pinang. From Dr. Cantor's Collection.
b–c. Adult: skins. Pinang. From Dr. Cantor's Collection.—Types of the species.
d. Young. From the Haslar Collection.

Dr. Cantor, who first described this species, says that the fighting propensities are greatest in the variety mentioned, which appears to have been produced during a long period of domestication. Dr. von Bleeker has observed that peculiarity also in specimens from other parts of the East Indian Archipelago. All the species of this family appear to be capable of being domesticated, and some of them deserve particular attention on account of the dazzling beauty of their colours or the flavour of their flesh.

Fam. 36. LUCIOCEPHALIDÆ.

Luciocephaloidei, *Bleek. Enumer. Spec.* p. xxx, and *Natuurk. Tydschr. Nederl. Ind.* xx. 1860, p. 395.

Body elongate, covered with scales of moderate size. Lateral line present. Teeth small. *Gill-opening wide*; pseudobranchiæ none; *a superbranchial organ, enclosed in a cavity behind the eye, and formed by two branchial arches, which are dilated into a membrane.*

One short dorsal fin; dorsal and anal spines none; ventrals thoracic, composed of one spine and five rays. Air-bladder none. Intestines very short.

Fresh waters of the East Indies.

1. LUCIOCEPHALUS.

Luciocephalus, *Bleek. Borneo,* ii. p. 273.

Body elongate, subcylindrical anteriorly and compressed posteriorly; intermaxillaries much protractile. Teeth in the jaws small, fixed; the descending and ascending branches of the intermaxillary toothed; teeth on the vomer minute. One short dorsal without spines, opposite to the soft anal; the anal is separated into two portions by a deep notch. Ventral fins thoracic, with one spine and five rays. Caudal rounded. Scales ctenoid; lateral line present. Pseudobranchiæ none; gill-opening wide, cleft to below the eye; air-bladder none. Intestines very short; pyloric appendages none.

Fresh waters of the East Indian Archipelago.

1. Luciocephalus pulcher.

Diplopterus pulcher, *Gray, Ill. Ind. Zool.* i. tab. . fig. 1.
Luciocephalus pulcher, *Bleek. Borneo,* ii. p. 274, and *Blitong,* p. 99.

B. 5. D. $\frac{1}{8-10}$. A. $\frac{1}{5-6}\Big|$ 13-12. L. lat. 36.

A broad black, inferiorly white-edged band runs from the snout through the eye to the caudal fin. Caudal black, with the rays red. Large individuals with round blackish spots on the body and on the fins.

Rivers of Banka, Biliton, and Borneo.

For the knowledge of the internal structure of this very singular fish we are indebted to Dr. v. Bleeker, who also discovered the superbranchial organ.

We commence the series of families which more or less approach the Malacopterygians with the *Atherinidæ* and *Mugilidæ*; they are true Acanthopterygians with regard to the structure of the fins, but their ventrals have an abdominal position. The structure of their skeleton affords an excellent character whereby to separate these two groups from each other.

Fam. 37. ATHERINIDÆ.

Body more or less elongate, subcylindrical, covered with scales of moderate size; lateral line indistinct. *Cleft of the mouth of moderate width, with the dentition feeble.* Eye lateral, well developed. Gill-opening wide; four gills; pseudobranchiæ; five or six branchiostegals. Two dorsal fins; the spines of the first feeble; the second of moderate length; anal like the soft dorsal, or rather longer. *Ventral fins abdominal,* with one spine and five rays. *Vertebræ very numerous* in the caudal and abdominal portions.

Carnivorous fishes inhabiting the seas of the temperate and tropical regions; several species entering or living in fresh water.

Synopsis of the Genera.

First Group: **Atherinina.** Teeth very small; scales cycloid. The first dorsal entirely separated from the second. An air-bladder. Pyloric appendages none.

Snout more or less obtuse, with the cleft of the mouth straight, oblique, extending to or beyond the anterior margin of the eye	1. Atherina, p. 392.
Snout more or less produced, with the cleft of the mouth generally not extending to the orbit; the lateral margins of the upper jaw are curved ...	2. Atherinichthys, p. 402.

Second Group: **Tetragonurina.** Teeth not very small, compressed; scales keeled and striated. The first dorsal continued on to the second. Air-bladder none. Pyloric appendages numerous.

Only one genus	3. Tetragonurus, p. 407.

First Group. ATHERININA.

Teeth very small; scales cycloid. The first dorsal entirely separated from the second. An air-bladder. Pyloric appendages none.

1. ATHERINA*.

Atherina, *Artedi, Synon.* p. 116.
Atherina, part., *Cuv. Règne Anim.*

Body subcylindrical or slightly compressed; snout more or less obtuse, with the cleft of the mouth straight, oblique, extending to or beyond the anterior margin of the eye. Teeth minute, those on the palate sometimes indistinct. Scales cycloid, of moderate size. Ventrals situated at some distance behind the pectoral. Air-bladder present. Pyloric appendages none. A silvery band along the side.

Seas of nearly all the temperate and tropical regions; several species entering fresh waters.

1. Atherina presbyter.

The Sand Smelt. Le Prêtre ou Roséré (France).
Duhamel, Pêches, ii. sect. 6. pl. 4. figs. 1–4, 7; *Osbeck, Nov. Act. Nat. Cur.* iv. p. 103. no. 22.
Atherine, *Penn. Brit. Zool.* iii. p. 287. pl. 65, & edit. 1812, iii. p. 434. pl. 76; ? *Gronov. Zoophyl.* no. 399, and *Mus. Ichthyol.* p. 23. no. 66 (mutilated?).
Atherina hepsetus, *Donov. Brit. Fishes,* iv. pl. 87; *Flem. Brit. Anim.* p. 217; *Turton, Brit. Faun.* p. 105 (not *L.*); ? *Gronov. Syst. ed. Gray,* p. 190.
—— presbyter, *Cuv. Règne Anim.*; *Jen. Man.* p. 377; *Yarr. Brit. Fishes,* 1st edit. i. p. 214, 2nd edit. i. p. 229, 3rd edit. ii. p. 170 (fig. bad); *Parn. Wern. Mem.* vii. p. 230, and *Fishes Frith of Forth,* p. 70; *Cuv. & Val.* x. p. 439. pl. 305; *Lowe, Trans. Zool. Soc.* ii. p. 184; *Guichen. Exp. Algér. Poiss.* p. 66; *Cuv. Règne Anim. Ill. Poiss.* pl. 76. fig. 3.

D. 7–8 | $\frac{1}{12}$. A. $\frac{1}{15-16}$. L. lat. 60. L. transv. 11. Vert. 50.

The origin of the anterior dorsal fin is above the middle of the ventral fins. The height of the body is one-sixth of the total length, the length of the head one-fifth. The diameter of the eye is two-sevenths of the length of the head, and equal to the extent of the snout and the width of the interorbital space. Snout moderately produced, with the cleft of the mouth oblique; the maxillary extends to below the anterior margin of the eye. Teeth distinct in the jaws and on the vomer. The distance between the dorsal and caudal fins is equal to, or rather more than, the length of the head. The silvery streak occupies the fifth series of scales and the adjoining halves of the fourth and sixth.

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* 1. Atherina rissoi, *Cuv. & Val.* x. p. 435.—Nice.
2. —— sarda, *Cuv. & Val.* x. p. 435.—Sardinia.
3. —— carolina, *Cuv. & Val.* x. p. 445.—Carolina.
4. —— waigiensis, part., *Quoy & Gaim. Voy. Uran. Poiss.* p. 335.—A. cylindrica, *Cuv. & Val.* x. p. 453.—Waigiou. Amboyna.
5. —— temminckii, *Bleek. Sumatra,* iii. p. 506.—East Indian Archipelago.
6. —— argyrotæniata, *Bleek. Journ. Ind. Archipel.* iii. 1849, *Celebes,* p. 72.—Bali, Celebes.
7. —— bimanensis, *Bleek. Journ. Ind. Archipel.* ii. 1848, *Sumbawa,* p. 637.—Sumbawa.—I have not seen the Journal containing the descriptions of the last two species.
8. —— tæniata, *Agass. in Spix, Pisc. Brasil.* p. 135; *Cuv. & Val.* x. p. 459.—Atlantic.
9. —— punctata, *Benn. in Proc. Comm. Zool. Soc.* 1832, p. 184.—Mauritius. (D. 5/11. A. 16.)
10. —— presbyter, var., *Eichw. Zool. Spec.* iii. p. 72.—Atherina caspia, *Eichw. Bull. Soc. Nat. Mosc.* 1838, p. 136.—Caspian Sea.

British Channel and coasts. Madeira. Coast of Algiers.

a–b. Adult. Falmouth. Purchased.
c. Adult. Fifeshire. From the Mus. Leach.
d, *e–g*, *h–k*. Adult and half-grown.
l. Fine specimen. (New Zealand??) Presented by Sir J. Richardson.

2. **Atherina pontica.**

Atherina presbyter, var., *Eichw. Zool. Spec.* iii. p. 72.
—— pontica, *Eichw. Bull. Soc. Nat. Mosc.* 1838, p. 137, and *Faun. Casp.-Caucas.* p. 206. pl. 33. figs. 3, 4; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 398; *Kessler, Bull. Soc. Nat. Mosc.* 1859, ii. p. 218.

D. 7–9 | 12–13. A. 15–16. L. lat. 46–48. L. transv. 9.

The root of the ventral fins falls vertically before the origin of the dorsal. The height of the body is contained seven times in the total length, the length of the head six times and a half. The depth of the extremity of the tail is much less than the diameter of the eye, which is considerably longer than the snout. Forehead and snout black.

Black Sea.

3. **Atherina hepsetus.**

Sauclet (France); Chucleto (Spain); Lattarina (Rome); Anguela (Venice); Coroneda (Sicily); Atherno (Greece).
'Αθερίνα, *Aristot.* vi. c. 17, ix. c. 2; *Oppian*, i. v. 108; *Athen.* vii. 285.
"Αφυα, *Athen. l. c.*
'Εψητὸς, *Athen.* vii. 293, 301, viii. 356.
Atherina, *Rondel.* i. lib. 7. c. 2. p. 216; *Gesn. Aquat.* iv. p. 72; *Aldrov.* ii. c. 36. p. 217; *Willughby*, iv. c. 12. p. 210; *Ray, Syn.* p. 79. sp. 3; *Jonst.* i. art. 18. p. 52. tab. 19. fig. 13; *Artedi, Synon.* p. 116. sp. 1.
Lavaronus, *Bellon.* i. p. 237.
Sauclet, *Duham. Pêches*, ii. sect. 6. pl. 4. fig. 3.
Atherina hepsetus, *L. Syst.* i. p. 519; *Hasselq. Iter Palæst.* p. 382; *Lacép.* v. p. 66; *Bl.* tab. 393. fig. 3 (very bad); *Bl. Schn.* p. 110. tab. 29. fig. 2 (very bad); *Risso, Ichth. Nice*, p. 337, and *Eur. Mérid.* iii. p. 469; *Cuv. & Val.* x. p. 423. pl. 302. fig. 1; *Bonap. Faun. Ital. Pesc.*; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 399; *Guichen. Exp. Algér. Poiss.* p. 66; *Kessler, Bull. Soc. Nat. Mosc.* 1859, ii. p. 217.
—— hepsetus, var. 1, *De la Roche, Ann. Mus.* xiii. p. 357.
? Atherina minuta, *Risso, Ichth. Nice*, p. 340; *Cuv. & Val.* x. p. 437 (young).
? Atherina marmorata, *Risso, l. c.* p. 339; *Cuv. & Val.* x. p. 437 (young).

D. 8–9 $\mid \frac{1}{11}$. A. $\frac{1}{12}$. L. lat. 60. L. transv. 11. Vert. 55–56.

The anterior dorsal fin is between the base of the ventral and the vent. The height of the body is one-seventh of the total length, the length of the head one-fifth; the diameter of the eye equals the length of the snout, is two-sevenths of the length of the head, and rather more than the width of the interorbital space. Snout produced, with the cleft of the mouth oblique; the maxillary extends to below the anterior margin of the eye. No conspicuous teeth. The silvery streak occupies the fifth series of scales (from the base of the first dorsal) and the adjoining halves of the fourth and sixth.

Mediterranean. Black Sea. Canaries.

a–c. Adult. Dalmatia.

4. **Atherina lacustris.**

Lattarina.
Atherina lacustris, *Bonap. Faun. Ital. Pesc.*; *Martens in Wiegm. Arch.* xxiii. p. 167. taf. 9. figs. 1, 2.

D. (5) 6–8 $\big|\,\frac{1}{10-11}$. A. $\frac{1}{12-13\,(14)}$. L. lat. 60. L. transv. 10–11.
Vert. 43–44.

The origin of the anterior dorsal fin is above the middle of the ventral. The height of the body is one-eighth of the total length, the length of the head one-fifth; the diameter of the eye is two-fifths of the length of the head, and longer than the snout, the extent of which equals the width of the interorbital space. Snout moderately produced, with the cleft of the mouth oblique; the maxillary extends to below the anterior margin of the eye. Teeth distinct in the jaws, none on the vomer. The silvery streak appears to occupy the fifth series of scales and the adjoining halves of the fourth and sixth.

Lakes of Albano and Nemi.

Martens has given a most accurate and detailed description of this species, and has shown some remarkable variations in the number of its fin-rays, which, if observed in single individuals, might have led to the distinction of several species. When, however, he states that the number of the transverse series of scales varies between forty-six and sixty, we suppose that the low numbers are only to be observed exceptionally in specimens in which the scales are disarranged in some way or other. The elongated body of this species and the number of its longitudinal series of scales clearly indicate that the number for the lateral line is the same as in *A. hepsetus* and *A. boyeri*. If, however, the low numbers should occur as frequently as the high ones, it becomes a question whether the lakes above-named are not inhabited by two species, one with larger, the other with smaller scales. The former might be *A. mochon*.

5. **Atherina boyeri.**

Joël (France); Cabasuda (Ivica).
Hepsetus, *Rondel.* i. lib. vii. c. 10. p. 215; *Gesner, Aquat.* iv. p. 71.
Lavaronus, *Gesner, l. c.* p. 73; *Aldrov.* ii. cap. 37. p. 218; *Jonst. Pisc.* i. art. 19. p. 52.
Anguella, *Willughb.* iv. c. 2. p. 209; *Ray, Syn.* p. 79.
Atherina hepsetus, var. 3, *De la Roche in Ann. Mus.* xiii. p. 357.

Atherina boyeri, *Risso, Ichth. Nice*, p. 333. pl. 10. fig. 38, and *Eur. Mérid.* iii. p. 470; *Cuv. & Val.* x. p. 432. pl. 303 (half-grown); *Bonap. Faun. Ital. Pesc.*; *Guichen. Exp. Algér. Poiss.* p. 66.

D. 6–8 | $\frac{1}{12}$. A. $\frac{1}{13\text{–}14}$. L. lat. 55–60. L. transv. 11. Vert. $\frac{24}{23}$.

The origin of the anterior dorsal fin is above the middle of the ventral. The height of the body is contained six times in the total length, the length of the head five times and a half. The diameter of the eye is one-third of the length of the head, and more than that of the snout, which equals the width of the interorbital space. Snout moderately produced, with the cleft of the mouth very oblique; the maxillary extends to below the anterior margin of the eye. Teeth distinct in the jaws and on the vomer. The silvery streak occupies the fifth series of scales and the adjoining halves of the fourth and sixth.

Mediterranean and the adjoining parts of the Atlantic. (According to Couch, occasionally on the coast of Cornwall.)

a–f, *g–i*. Adult. Lisbon.
k, *l*. Adult: not good state. Madeira. Presented by the Rev. R. T. Lowe.
m–o. Large specimens. Cadiz. From the Haslar Collection.
p. Fine specimen. Mogadore. Presented by the Rev. R. T. Lowe.
q, *r*. Adult: not good state.
s. Adult female: skeleton. Lisbon. Presented by the Rev. R. T. Lowe.
t. Ovarium of specimen *s*. It is single, and contains eggs in different states of development.

The abdominal and caudal portions of the vertebral column are of nearly equal length; the lower apophyses of the anterior caudal vertebræ are curved, bent outwards, forming a wide canal for the hind part of the air-bladder.

6. **Atherina martinica.**

Cuv. & Val. x. p. 459.

D. 6 | $\frac{1}{7}$. A. $\frac{1}{18\text{–}19}$.

The spinous dorsal fin is opposite to the commencement of the anal. Scales with the margin crenulated. Otherwise similar to *A. hepsetus*. (*Val.*)

Martinique.

7. **Atherina breviceps.**

Cuv. & Val. x. p. 445; *Bleek. Cape of Good Hope*, p. 20.

D. 7 | $\frac{1}{12}$. A. $\frac{1}{16}$. L. lat. 45. L. transv. 9.

The height of the body is contained seven times in the total length, the length of the head six times and a half; the diameter of the eye is two-sevenths of the length of the head, and equal to the extent of the snout and to the width of the interorbital space. Snout moderately produced, with the cleft of the mouth very oblique; the maxillary extends slightly beyond the vertical from the anterior margin of the eye. Teeth distinct on the vomer and in the jaws. The silvery streak occupies the fifth series of scales and the angles of the scales of the series adjoining.

Cape of Good Hope.

a. Adult. Presented by Sir A. Smith.

8. Atherina parvipinnis.

Cuv. & Val. x. p. 446.

$$\mathrm{D.}\ 6 \left| \frac{1}{15}. \quad \mathrm{A.}\ \frac{1}{18}. \right.$$

The spinous dorsal is rather small. The height of the body is one-fifth of the total length. Snout of moderate extent, equal to the diameter of the eye. (*Val.*)

Cape of Good Hope.

9. Atherina mocho.

Mocho or Mochon (Ivica).

Atherina hepsetus, var. 3 (mochon), *De la Roche, Ann. Mus.* xiii. p. 358.

—— mochon, *Cuv. & Val.* x. p. 434. pl. 304 (not good); *Bonap. Faun. Ital. Pesc.* (fig. not good); *Guichen. Exp. Algér. Poiss.* p. 66.

$$\mathrm{D.}\ 7\text{–}8 \left| \frac{1}{11}. \quad \mathrm{A.}\ \frac{1}{14\text{–}15}. \quad \mathrm{L.\ lat.}\ 45. \quad \mathrm{L.\ transv.}\ 8. \quad \mathrm{Vert.}\ \frac{23}{23}. \right.$$

The origin of the anterior dorsal fin is a little behind the middle of the ventral. The height of the body is one-sixth of the total length, the length of the head one-fifth; the diameter of the eye is one-third of the length of the head, a little more than the extent of the snout, and much more than the width of the interorbital space. Snout moderately produced, with the cleft of the mouth oblique; the maxillary extends to below the anterior margin of the eye. Teeth distinct in the jaws and on the vomer. The silvery streak occupies the adjoining halves of the fourth and fifth series of scales.

Mediterranean.

a, b. Adult. Dalmatia.

c–g. Adult. Mediterranean. Presented by Dr. Rüppell.

It is nearly impossible to determine this species from the accounts given by Valenciennes and Bonaparte, and the figures illustrating them are very indifferent and inaccurate in several points. Valenciennes states fifteen anal rays in the text, and seventeen in the formula of the fins, which latter has been copied by Bonaparte. The figure given by the former represents fifteen anal rays, but much too small an eye; that given by the latter does not afford any idea as to the number of the anal rays. The principal character of this species are the scales, which are considerably larger than in the other European species.

10. Atherina hepsetoides.

Richards. in Ann. & Mag. Nat. Hist. 1843, xi. p. 178.

D. 9 | $\frac{1}{11}$. A. $\frac{1}{14}$. P. 15. Vert. 48.

The anterior dorsal fin is between the base of the ventral and the vent. The height of the body is one-eighth of the total length, the length of the head nearly one-sixth; the diameter of the eye is one-third of the latter, and a little more than the length of the snout. Cleft of the mouth oblique; teeth minute. (*Richards.*)

Port Arthur (Van Diemen's Land).

Sir J. Richardson has examined the skeleton of this species, and it appears from his description that the canal for the air-bladder is continued on to the twenty-third vertebra; "at the twenty-fourth vertebra the change from lateral to inferior spinous processes is complete."

11. Atherina presbyteroides.

Richards. Ann. & Mag. Nat. Hist. 1843, xi. p. 179.

D. 9 | 10–11. A. $\frac{1}{12}$. P. 11. Vert. 46.

The first dorsal fin stands wholly anterior to the anus, commencing just perceptibly behind the ventrals. The height of the body equals the length of the head, and is one-fifth of the total. The diameter of the eye is one-third of the length of the head, and more than that of the snout. Teeth distinct. There are two series of scales above the silvery band. (*Richards.*)

Port Arthur (Van Diemen's Land).

12. Atherina forskålii.

? Atherina hepsetus, *Forsk.* p. 69.
Atherina forskålii, *Rüpp. N. W. Fische,* p. 132. taf. 33. fig. 1; *Cant. Catal.* p. 103.

D. 5–6 | $\frac{1}{9-10}$. A. $\frac{1}{13-14}$. L. lat. 40. L. transv. 7.

The origin of the spinous dorsal fin is immediately behind the vertical from the vent, consequently the dorsal is much nearer to the anal than to the root of the ventral; its distance from the posterior margin of the operculum is not much more than one length of the head. The height of the body is contained six times in the total length, the length of the head four times and a third; the diameter of the eye is two-fifths of the latter, equal to the width of the interorbital space, and much longer than the snout. Snout rather short, with the jaws equal in length, and with the cleft of the mouth oblique; the maxillary extends beyond the vertical from the orbital margin. Teeth distinct in the jaws, on the vomer and the palatine bones. The silvery streak occupies the third and the adjoining half of the fourth series of scales. Scales with the margin entire.

Red Sea. Sea of Pinang.

a–e. Adult. Red Sea. Presented by Dr. Rüppell.

13. Atherina bleekeri.

Atherina japonica, *Bleek. Verhand. Batav. Genootsch.* xxv., *Japan*, p. 40. fig. 2 (not *Houtt.*).

D. $5 \mid \frac{1}{10}$. A. $\frac{1}{12}$. L. lat. 45–48. L. transv. 7.

The origin of the anterior dorsal fin is behind the vertical from the extremity of the ventrals, and rather nearer to the origin of the anal than to the root of the ventrals. Scales obtusely denticulated. The height of the body is contained six times and a half in the total length, the length of the head five times and a half; the diameter of the eye is contained twice and two-thirds in the length of the head, equal to the width of the interorbital space, and much longer than the snout. Snout short, slightly pointed, with the upper jaw overlapping the lower; cleft of the mouth oblique; the maxillary extends beyond the vertical from the anterior margin of the eye. Teeth inconspicuous in the jaws, rather more distinct on the vomer. The silvery streak occupies the third and the adjoining half of the fourth series of scales.

Chinese and Japanese Seas.

a, b, c–f. Adult. China. Presented by J. R. Reeves, Esq.

14. Atherina afra.

Peters in Wiegm. Arch. 1855, p. 244.

B. 6. D. $6 \mid \frac{1}{10}$. A. $\frac{1}{13\text{–}14}$. L. lat. 36. L. transv. 6.

The spinous dorsal fin is opposite to the vent, above the middle, between the ventral and anal fins; its distance from the posterior margin of the operculum is one-half more than the length of the head. The length of the head is contained four times and one-third in the total length (without caudal); the diameter of the eye is equal to the width of the interorbital space, one-third of the length of the head, and longer than the snout. Cleft of the mouth oblique. Teeth distinct in the jaws, on the vomer and the palatine bones. Scales of the upper parts blackish, with bluish-white dots. (*Pet.*)

Coast of Mozambique.

15. Atherina valenciennesii.

Bleeker, Sumatra, iii. p. 507.

D. $5\text{–}6 \mid \frac{1}{9}$. A. $\frac{1}{12}$. L. lat. 40.

The anterior dorsal is nearer to the anal than to the ventral fins. The height of the body is contained seven times in the total length, the length of the head five times and a half. The diameter of the eye is nearly twice as long as the snout, about equal to the width of the interorbital space, and contained twice and a half or twice and two-thirds in the length of the head. The maxillary extends to below the anterior margin of the eye. Teeth in the jaws, more distinct on the vomer and the palatine bones. Scales obtusely denticulated. Caudal brown-edged. (*Bl.*)

Seas of Padang, Batavia, and Singapore.

16. Atherina pinguis.

Atherina pinguis, *Lacép.* v. p. 372. pl. 11. fig. 1; *Bleek. Act. Soc. Sc. Indo-Nederl.* viii., *Sumatra*, viii. p. 24.
—— affinis, *Benn. Proc. Comm. Zool. Soc.* i. 1831, p. 166.
—— pectoralis, *Cuv. & Val.* x. p. 447.

D. $6 \left| \frac{1}{10} \right.$. A. $\frac{1}{14-15}$. L. lat. 42–45. L. transv. 7. Vert. 20/23.

The origin of the spinous dorsal fin is at some distance behind the vertical from the vent, consequently the dorsal is much nearer to the anal than to the root of the ventral; its distance from the posterior margin of the operculum is equal to one length of the head and one-third. The height of the body is contained five times and two-thirds in the total length, the length of the head four times and two-thirds. The diameter of the eye is two-fifths of the length of the head, equal to the width of the interorbital space, and much longer than the snout. Snout obtuse, short, with the cleft of the mouth very oblique, and the upper jaw overlapping the lower; the maxillary extends beyond the vertical from the anterior margin of the eye. Teeth distinct in the jaws, on the vomer and the palatine bones. The silvery streak occupies the third series of scales and the adjoining quarter of the fourth. The membrane in which the dorsal scales are rooted is minutely dotted with white; a blackish blotch on the posterior extremity of the pectoral; iris with a blackish spot superiorly.

Eastern coasts of Africa. Bombay. Coasts of Australia and of the islands north of it.

a. Fine specimen. Madagascar. Presented by Dr. J. E. Gray.
b. Fine specimen. Aneiteum. From Mr. Macgillivray's Collection.
c–d, *e*. Adult. Sydney.
f–g, *h*. Adult. South Australia. From Mr. Dring's Collection.
i–k, *l–o*, *p*. Adult and half-grown. Australia.
q, *r*. Adult. Australia.
s. Adult: skeleton. Sydney. Presented by Sir J. Richardson.

Forster has described a species of *Atherina* from New Caledonia under the name of *A. lacunosa*, which is probably identical with the above species (Descript. Anim. ed. Licht. p. 298; Bl. Schn. p. 112). The sketch preserved in the British Museum is a rough pencil-drawing, and does not indicate any specific character: some streaks on the pectoral fin, which are blacker than the rest of the drawing, seem to be intended for a peculiar marking of that fin. When, therefore, Valenciennes (x. p. 454) applies Forster's denomination to specimens without a distinct blackish spot on the pectoral fin, it is quite arbitrary. They are, at all events, very closely allied to *A. pinguis*, and may prove to be a mere variety of it, in which case Forster's name will have the priority.

The abdominal and caudal portions of the vertebral column are nearly of equal length; the apophyses of the anterior caudal vertebræ do not form a canal for the air-bladder, as in *A. boyeri* and other species.

17. Atherina lacunosa.

Atherina waigiensis (part.), *Quoy & Gaim. Voy. Uran. Zool.* p. 334.
—— lacunosa, *Bleek. Sumatra,* iii. p. 504 (probably not *Forst.* or *Valenc.*).

D. $6 \mid \frac{1}{9}$. A. $\frac{1}{13-15}$. L. lat. 44.

The spinous dorsal fin is nearer to the anal fin than to the ventrals. The height of the body is two-thirteenths of the total length, the length of the head two-ninths. Snout much shorter than the eye, the maxillary extending to below the pupil; teeth in the jaws less distinct than on the vomer and the palatine bones. Margin of the scales denticulated. No black spot on the pectoral fin. (*Bleek.*)

East Indian Archipelago. Waigiou.

18. Atherina duodecimalis.

? Atherina duodecimalis, *Cuv. & Val.* x. p. 458.
Atherina duodecimalis, *Bleek. Riouw,* p. 485.

D. $5 \mid \frac{1}{9}$. A. $\frac{1}{11}$. L. lat. 35.

The spinous dorsal fin occupies the middle between the ventral and anal. The height of the body is contained five times and a half in the total length, the length of the head four times and a quarter. The width of the head is four-sevenths of its length. The diameter of the eye is nearly one-half of the length of the head, twice the extent of the snout, and more than the width of the interorbital space. Cleft of the mouth very oblique; the maxillary extends below the anterior half of the eye. The length of the pectoral fin is contained five times and a half in the total. No black dots along the side of the body. (*Bl.*)

East Indian Archipelago. (Ceylon?)

19. Atherina stipes.

Müll. & Trosch. in Schomb. Hist. Barbad. p. 671.

D. $5 \mid \frac{1}{9}$. A. $\frac{1}{12}$. L. lat. 37. L. transv. 6.

Similar to *A. boyeri* in form; the diameter of the eye is nearly equal to the width of the interorbital space, and twice or more than twice the extent of the snout; the maxillary extends beyond the vertical from the anterior margin of the orbit. The distance of the end of the snout from the root of the ventral is two-thirds of that from the dorsal. There is a sharp undulated edge forming the upper margin of the orbit. Teeth numerous and distinct in both jaws and on the palate. Two series of small black dots along the side of the tail.

Sea of Barbadoes.

The typical specimens are in the Berlin Museum.

a. Not good state. From Mr. Parnell's Collection.

20. Atherina endrachtensis.

Quoy & Gaim. Voy. Uran. Zool. p. 334; *Cuv. & Val.* x. p. 456.

D. $5 \mid \frac{1}{8}$. A. $\frac{1}{10}$. L. transv. 7. Vert. 36.

The height of the body is about one-sixth of the total length; the width of the head between the eyes is two-thirds of its length; snout half as long as the eye; pectoral long, its length being somewhat less than one-fourth of the total. A series of black dots along the middle of the silvery band; two other series along the side of the back and a single one on the belly. (*Val.*)

South-west coast of New Holland. New Guinea.

21. Atherina brachyptera.

Bleeker, Banda, i. p. 243.

D. $5 \mid \frac{1}{6}$. A. $\frac{1}{9}$. L. lat. 38.

The spinous dorsal fin is above the middle between the anal and the ventrals. The height of the body is one-eighth, the length of the head one-fifth of the total length; the diameter of the eye is contained twice and one-third in the length of the head. Cleft of the mouth oblique; the maxillary extends to below the anterior margin of the eye. (*Bl.*)

Sea of Banda Neira.

22. Atherina microstoma.

D. $6 \mid \frac{1}{10}$. A. $\frac{1}{12}$. P. 12. L. lat. 40. L. transv. 8.

The whole of the spinous dorsal is above the ventral fin. The height of the body is contained six times and a half in the total length, the length of the head five times; the diameter of the eye is one-third of the length of the head, equal to the width of the interorbital space, and more than the extent of the snout, which is short and slightly pointed. The cleft of the mouth is very oblique, with the jaws equal anteriorly; the mouth is rather small, the maxillary not extending to the anterior margin of the eye. Teeth conspicuous in the jaws and on the vomer. The silvery band occupies the adjoining halves of the fourth and fifth series of scales; there are two or three rows of dots running from its origin to the base of the caudal.

Van Diemen's Land.

a–c. Adult. Three inches and a half long. Presented by Dr. Robertson.

This species agrees with the true *Atherinæ* in the structure of the mouth, but is distinguished by the shortness of the maxillary.

23. Atherina pauciradiata.

D. $5\text{–}6 \mid \frac{1}{6}$. A. $\frac{1}{7}$. L. lat. 25. L. transv. 6.

The spinous dorsal fin is above the posterior half of the ventral fin. The height of the body is one-fifth of the total length, the length of the head one-fourth; the diameter of the eye is contained three times and two-thirds in the latter, equal to the extent of the snout, but much less than the width of the interorbital space. Mouth very protractile, oblique, with the jaws equal anteriorly; the maxillary extends to below the anterior margin of the eye. Minute teeth in the jaws. The silvery band is narrow, occupying the central half of the third series of scales.

North-west coast of Australia.

a, *b*. Thirty lines long. From the Haslar Collection.

2. ATHERINICHTHYS*.

Atherina, sp., *Cuv. Règne Anim.*
Atherinoides et Atherinichthys, *Bleek. Verhand. Batav. Genootsch.* xxv. 1853, *Japan*, p. 40.
Basilichthys, *Girard, Proc. Acad. Nat. Sc. Philad.* 1854, p. 198.
Atherinopsis, *Girard, l. c.* p. 134.

Body subcylindrical or slightly compressed; snout more or less produced, with the cleft of the mouth not extending to the orbit (except in *B. nigrans*), the lateral margins of the upper jaw being curved. Teeth very small, palate toothless (cfr. *A. vomerina*, Val.). Scales cycloid, of moderate or small size. Ventrals situated at some distance behind the pectoral. Air-bladder present; pyloric appendages none. A silvery (black) band along the side.

Coasts and fresh waters of America and Tasmania. Rivers of Australia.

1. Atherinichthys jacksoniana.

Atherina jacksoniana, *Quoy & Gaim. Voy. Uran. Zool.* p. 333; *Cuv. & Val.* x. p. 461.

$$\text{D. } 8 \mid \tfrac{1}{11}. \quad \text{A. } \tfrac{1}{18}.$$

The spinous dorsal is above the interspace between the ventrals and the anal. The height of the body is one-ninth of the total length.

Port Jackson. Van Diemen's Land.

2. Atherinichthys laticlavia.

Pesce Rey.
Atherina regia, *Humboldt, Observ. Zool.* ii. p. 187; *Cuv. & Val.* x. p. 474.
—— laticlavia, *Cuv. & Val.* x. p. 473; *Gay, Hist. Chil. Zool.* ii. p. 252. lam. 4. fig. 1.

$$\text{D. } 7 \mid \tfrac{1}{10\text{–}11}. \quad \text{A. } \tfrac{1}{18\text{–}19}. \quad \text{L. lat. } 80\text{–}86. \quad \text{L. transv. } 16.$$

Ten longitudinal series of scales on the tail behind the anal fin. The anterior dorsal fin is somewhat nearer to the vertical from the vent than to that from the root of the ventral. The height of the body is contained six times to seven times and three-fourths in the total length, the length of the head six times. The diameter of the eye is one-fifth or one-sixth of the length of the head, less than the width of the interorbital space, and not quite one-half of the extent of the snout; in very large specimens the eye is still smaller. The silvery streak occupies the sixth, seventh, eighth, and the adjoining half of the ninth series of scales.

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* 1. Atherina lessonii, *Cuv. & Val.* x. p. 471.—St. Catherine.

Coast of Chile. Falkland Islands.

a–b. Fine specimens. Salt water, Valparaiso. From Mr. Bridges' Collection.
c, d. One foot long. Falkland Islands.
e. Sixteen inches long; has been in chloride of zinc. Port Louis. From the Haslar Collection.
f, g, h. Many specimens in a bad state. From the Haslar Collection.
i. Eighteen inches long: skin. From the Collection of the Zoological Society.

3. Atherinichthys microlepidota.

Atherina microlepidota, *Jenyns, Zool. Beagle, Fishes*, p. 78. pl. 16. fig. 1; *Gay, Hist. Chil. Zool.* ii. p. 253.
Basilichthys microlepidotus, *Girard, Proceed. Acad. Nat. Sc. Philad.* 1854, p. 198, and *U. S. Naval Astron. Exped. South Hemisph.* ii. p. 238. pl. 30. figs. 6–9.

D. 6 | 11. A. 17. L. transv. 18–20.

Fifteen longitudinal series of scales on the tail, behind the anal. The spinous dorsal commences above, or immediately behind, the extremity of the ventral fin, and is nearer to the vertical from the anal than to that from the base of the ventral. The height of the body is one-fifth or one-sixth of the total length (in adult specimens), the length of the head two-elevenths.

Coast of Chile. Mapocho (tributary of the Rio de Maypu).

4. Atherinichthys nigricans.

Atherina nigricans, *Richards. Voy. Ereb. & Terr. Fishes*, p. 77. pl. 42. figs. 13–18.

D. 7 | $\frac{1}{12}$. A. $\frac{1}{16}$. L. lat. 90–95. L. transv. 17.

The spinous dorsal fin commences somewhat behind the vertical from the base of the ventral. The height of the body is contained eight times and a half in the total length, the length of the head six times. The diameter of the eye is one-sixth of the length of the head, and nearly one-half of the width of the interorbital space, which is less than the extent of the snout. The silvery streak occupies three series of scales.

Falkland Islands.

a. Type of the species: five inches long.

It is very doubtful whether the black ground-colour is natural, or has been produced by the fluid in which the fish was preserved.

5. Atherinichthys alburnus.

D. $7 \,\big|\, \frac{1}{12}$. A. $\frac{1}{18}$. L. lat. 105. L. transv. 20.

Similar to *B. laticlavia.* The base of the ventral fins falls vertically below the origin of the anterior dorsal fin. The height of the body is contained eight times and a half in the total length, the length of the head six times. The diameter of the eye is one-sixth or one-fifth of the length of the head, less than the width of the interorbital space, and not quite one-half of the extent of the snout. The silvery streak occupies four series of scales.

Seven inches long.

Magellan's Strait.

a–d. Adult and half-grown: bad state. Magellan's Strait. Presented by the Lords of the Admiralty.

6. Atherinichthys humboldti.

Atherina humboldtiana, *Cuv. & Val.* x. p. 479. pl. 306.
—— vomerina, *Cuv. & Val.* x. p. 481.

D. $5 \,\big|\, \frac{1}{10\text{–}11}$. A. $\frac{1}{19\text{–}20}$. L. lat. 50.

The anterior dorsal fin is opposite to the end of the ventrals. The height of the body is one-fifth of the total length, the length of the head one-fourth; the diameter of the eye is one-sixth of the latter, and one-half of the extent of the snout, which nearly equals the width of the interorbital space. (*Val.*)

Mexico.

The typical specimen is in the Berlin Museum.

7. Atherinichthys bonariensis.

Atherina bonariensis, *Cuv. & Val.* x. p. 469.

D. $5 \,\big|\, \frac{1}{9\text{–}11}$. A. $\frac{1}{16\text{–}18}$. L. transv. 12. Vert. 50.

The anterior dorsal is opposite to the vent, somewhat in front of the commencement of the anal; the posterior is above the hinder half of the latter. The height of the body is contained six and a half times in the total length, the length of the head four and a half times; the diameter of the eye is one-sixth of the latter. (*Val.*)

Buenos Ayres.

Atherina lichtensteinii, Cuv. & Val. x. p. 476, is probably merely a very large specimen of this species. The typical specimen is from Montevideo, nineteen inches long, and preserved in the Berlin Museum.

8. Atherinichthys brasiliensis.

Atherina brasiliensis, *Quoy & Gaim. Voy. Uran. Poiss.* p. 332; *Cuv. & Val.* x. p. 467.
—— macrophthalma, *Agass. in Spix, Pisc. Brasil.* p. 136. pl. 47. fig. 1.

D. $4\text{–}5 \,\big|\, \frac{1}{8\text{–}9}$. A. $\frac{1}{18\text{–}20}$. L. lat. 38. L. transv. 8.

The origin of the anterior dorsal fin is opposite to that of the anal. The height of the body is contained five times and a third in the total length, and nearly equal to the length of the head. The diameter of the eye is one-fourth of the latter, two-thirds of the length of the snout, and rather more than one-half of the width of the interorbital space; in young individuals it is much larger, equal to the width of the space between the orbits. The silvery streak occupies the adjoining halves of the third and fourth series of scales. The lower caudal lobe is longer than the upper.

Coasts of Brazil and Mexico.

a. Fine specimen. Rio Janeiro. Presented by A. Fry, Esq.
b. Fine specimen. Mexico. From M. Sallé's Collection.
c. Half-grown.

9. Atherinichthys incisa.

Atherina incisa, *Jenyns, Zool. Beagle, Fishes,* p. 79. pl. 16. fig. 2.

D. $5\text{–}6 \mid \frac{1}{8\text{–}10}$. A. $\frac{1}{17\text{–}19}$. L. transv. 12.

The spinous dorsal fin is opposite to the space between the extremity of the ventral and the origin of the anal. Each scale with one or two deep incisions posteriorly. The height of the body is one-ninth of the total length, the length of the head one-sixth. (*Jen.*)

39° S. lat., 61° W. long.

10. Atherinichthys argentinensis.

Atherina argentinensis, *Cuv. & Val.* x. p. 350; *Jenyns, Zool. Beagle, Fishes,* p. 77.

D. $5 \mid \frac{1}{8\text{–}9}$. A. $\frac{1}{19}$. L. transv. 10.

The anterior dorsal fin is opposite to the vent. Depth of the body exactly one-ninth of the total length, measuring this last to the end of the middle caudal rays; the length of the head is five and a half times in the same, measuring this last to the end of the caudal lobes. Scales truncated behind, with a single small notch on the middle of the margin. Pectorals exactly the length of the head. Breadth of the silvery band one-fifth of the greatest depth of the body. (*Jen.*)

Montevideo. Maldonado.

11. Atherinichthys gracilis.

D. $4 \mid \frac{1}{8}$. A. $\frac{1}{19}$. L. lat. 40. L. transv. 9.

The origin of the anterior dorsal fin is opposite to the vent, exactly in the middle of the distance between the end of the snout and the base of the caudal. The distance between the origins of the two dorsal fins is somewhat more than one-half of that between the origin of the posterior and the caudal. The height of the body is contained nine times in the total length, the length of the head five times and a half. The silvery band is narrow, and occupies a portion of the fourth series of scales. Scales with the margin entire. Caudal lobes equal in length; caudal somewhat longer than the pectoral, and rather shorter than the head.

Hab. —— ?

Thirty-one lines long. Probably young.

12. Atherinichthys menidia.

Silver-fish.
Atherina menidia, *L. Syst.* i. p. 519; *Cuv. & Val.* x. p. 462; *Dekay, New York Fauna, Fishes*, p. 142. pl. 74. fig. 236.
—— viridescens, *Mitch. Lit. & Phil. Trans. New York*, i. p. 447.

$$D. 5 \,\Big|\, \frac{1}{9}. \quad A. \frac{1}{25}. \quad \text{Vert. } 44.$$

The spinous dorsal is above the commencement, the soft above the middle of the anal fin. The height of the body is contained seven times in the total length, the length of the head five times and a half; the length of the pectoral equals the height of the body.

Atlantic coasts of the United States.

13. Atherinichthys notata.

Small Silver-side.
Atherina menidia, *Lacép.* v. p. 376; (not *L.*).
—— notata, *Mitch. Lit. & Phil. Trans. New York*, i. p. 446. pl. 4. fig. 6; *Dekay, New York Fauna, Fishes*, p. 141. pl. 28. fig. 88.
—— boscii, *Cuv. & Val.* x. p. 465; *Storer, Massach. Report*, p. 62.

$$D. 5 \,\Big|\, \frac{1}{8}. \quad A. \frac{1}{25}. \quad \text{L. lat. } 48. \quad \text{L. transv. } 9.$$

The spinous dorsal fin is above the commencement, the soft a little behind the middle of the anal fin. The height of the body is one-sixth of the total length, the length of the head one-fifth; the length of the pectoral fin equals the height of the body. The silvery streak occupies the fourth and the adjoining part of the fifth series of scales.

Atlantic coasts of the United States.

Perhaps identical with *A. menidia.*

a. Adult.

14. Atherinichthys californiensis.

The Smelt.
Atherinopsis californiensis, *Girard in Proc. Acad. Nat. Sc. Philad.* vii. 1854, pp. 134, 141, 151, and in *Journ. Bost. Soc. Nat. Hist.* vi. 1857, pl. 24. figs. 1–4, and in *U. S. Pacif. R. R. Exped. Fishes*, p. 103. pl. 22 *c*.
Atherina storeri, (*Ayres*) *Girard in Proc. Acad. Nat. Sc. Philad.* 1856, p. 136.

$$B. 6. \quad D. 7 \mid 13. \quad A. \frac{1}{27}. \quad \text{L. transv. } 13.$$

The origin of the spinous dorsal is opposite to the end of the ventrals. The height of the body is one-seventh of the total length, the length of the head one-sixth. The diameter of the eye is contained four and a half times in the length of the head. (*Gir.*)

Coast of California.

15. Atherinichthys nigrans.

Atherina nigrans, *Richards. Ann. & Mag. Nat. Hist.* 1843, xi. p. 180.

$$D. 5 \,\Big|\, \frac{1}{12}. \quad A. \frac{1}{18}. \quad \text{L. lat. } 35. \quad \text{L. transv. } 10.$$

The height of the body is one-fourth of the total length, the length of the head one-fifth; the diameter of the eye equals the extent of the snout (in mature specimens), and is nearly one-fourth of the length of the head. The first dorsal spine pungent, the others filiform; the last dorsal rays produced, reaching to the base of the caudal. The ventrals end in a thread-like tip which overlaps the commencement of the anal. The first dorsal and the anal commence in nearly the same vertical. An even black stripe replaces the usual silvery band, and is continued forwards over the gill-cover, upper half of the eye, and sides of the snout; it occupies the fifth series of scales and the adjoining parts of the fourth and sixth.

Freshwater streams of Port Essington.

a. Three inches long: skin. King's River, near Victoria.—Type of the species.
b. Adult: skin. Port Essington. From Mr. Gould's Collection.
c–e. Twenty-one lines long: skins. Severn River (New South Wales).—I am not quite sure whether these specimens really belong to *A. nigrans*. The form is nearly the same, but they have a very indistinct blackish band on the tail.
f. Adult: skin. Australia.

Second Group. TETRAGONURINA.

Teeth not very small, compressed; scales keeled and striated. The first dorsal continued on to the second. Air-bladder none. Pyloric appendages numerous.

3. TETRAGONURUS.

Tetragonurus, *Risso, Ichth. Nice*, p. 347.

Body subcylindrical, somewhat elongate; snout of moderate length, obtuse; lower jaw elevated, with a convex dental margin. Teeth in single series, compressed, triangular, rather small; teeth on the palate. Scales rather small, with deep striæ, those of every single transverse series coherent. Ventrals abdominal, but inserted below the middle of the pectoral. Air-bladder none. Pyloric appendages numerous.

Mediterranean, and the neighbouring parts of the Atlantic.

This genus has been annexed to very different families: first to the *Mugilidæ* by Cuvier, then to the *Scombridæ* by Lowe, and finally to the *Notacanthini* by Müller. The attempt of the latter is certainly the most unfortunate, and I doubt whether Müller has known the fish, except from Valenciennes' description. Even when the artificial group called by Müller *Notacanthini* is divided into natural families, *Tetragonurus* has no affinity whatever either to *Notacanthus* or to *Mastacembelus*. When Mr. Lowe places this fish among the Scomberoids of Cuvier, he implies, in the words by which he modifies his view, that he means that portion of them which I have called *Trichiuridæ*. But in *Tetragonurus* the ventral fins are truly abdominal, not fixed to the humeral arch, which is never the case in the *Trichiuridæ* with developed ventral fins; the *Trichiuridæ*, moreover, have no true scales. I think, therefore, that Cuvier was right in placing this fish near those Acanthopterygians which have abdominal ventral fins; but it is much more closely allied to *Atherina* than to *Mugil*, not having either the mouth, or the pharyngeal apparatus, or the peculiar structure of the stomach, or the osteological peculiarities of the latter. On the other hand, *Tetragonurus* agrees with *Atherina* in the structure of the gills and of the fins, in the large number of vertebræ, and in the nature of its food, whilst the differences between the two genera are such as to admit of their separation into two groups of the same family.

1. **Tetragonurus cuvieri.**

Courpata (Nice).
Mugil niger, *Rondel.* xv. cap. 6. p. 423; *Gesner, Aquat.* lib. iv. p. 653; *Willughby*, p. 276. tab. R. 4. fig. 4.
Corvus niloticus, *Aldrov. De Pisc.* lib. v. c. 25. p. 610.
Tetragonurus cuvieri, *Risso, Ichthyol. Nice*, p. 347. pl. 10. fig. 37 (bad), and *Eur. Mérid.* iii. p. 382; *Cuv. & Val.* xi. p. 172. pl. 318; *Cuv. Règne Anim. Ill. Poiss.* pl. 76. fig. 2; *Guichen. Explor. Algér. Poiss.* p. 68; *Mettenheimer in Abhandl. Senck. Gesellsch.* p. 215. tab. 17–19.

B. 5. D. $15\text{–}21 \mid \frac{1}{11\text{–}13}$. A. 10–12. L. lat. 118–120.
L. transv. 30. Vert. 36/22.

a. Fine specimen. Sicily.
b. Adult: stuffed. Mediterranean. Presented by W. Yarrell, Esq.

Mr. Lowe, who obtained the species in the sea of Madeira, points out several differences between his specimen and the description of Valenciennes, which appear to him of sufficient importance to distinguish a second species, *Tetragonurus atlanticus* (Proc. Zool. Soc. 1839, p. 79, and Trans. Zool. Soc. iii. p. 5, Fish. Mad. p. 130). Although I do not share this opinion, it will always be valuable, in so scarce a fish as *T. cuvieri*, to note peculiarities of the single individuals which are preserved in our collections.

The specimen which is preserved in spirits in the British Museum is $12\frac{1}{2}$ inches long. The height of the body, behind the pectorals, is contained seven times and a half in the total length; the tail, between the vertical fins, is rather deeper than thick; the two keels on each side of the caudal strongly prominent. The length of the head is six times and a quarter in the total (the caudal fin included). The eye is at least as high as broad, one-sixth of the length of the head, and two-thirds of the width of the interorbital space. The teeth in both jaws are curved backwards, triangular and compressed, those of the upper jaw less than of the lower; there are twenty-eight on each intermaxillary and thirty-three on each mandibulary.

The spinous dorsal fin in both specimens is continued on to the soft portion, and composed of twenty-one spines in the stuffed one (as in Cuvier's figure), and of eighteen in the other. Risso and Valenciennes found fifteen. Each of these spines is slender, as long as the eye, with a membrane posteriorly, which does not extend to the next following spine. The spines can be received in a narrow groove. The caudal is deeply forked; the length of one of its longest rays is one-ninth of the total. Each scale is deeply striated, with five or six keels, each keel terminating in a minute point. The scales of every transverse series are entirely coherent, whilst the whole series can easily be separated from the adjoining. Colour uniform brown.

Fam. 38. MUGILIDÆ.

Mugiloidei, *Bleek. Enum. Spec.* p. xxiv.

Body more or less oblong and compressed, covered with cycloid scales of moderate size; lateral line none. *Cleft of the mouth narrow or of moderate width, without or with feeble teeth.* Eye lateral, well developed. Gill-opening wide; four gills; pseudobranchiæ; five or six branchiostegals. Two short dorsal fins, the anterior with four stiff spines; anal a little longer than the dorsal opposite. Ventral fins with one spine and five rays, *abdominal*, suspended from the elongate coracoid bone. *Number of vertebræ twenty-four.*

Fresh waters and coasts of all the temperate and tropical regions. Feeding on soft organic substances or very small animals.

Synopsis of the Genera

No true teeth in the jaws	1. Mugil, p. 409.
Small teeth, at least in the upper jaw; lower lip with the margin rounded	2. Agonostoma, p. 461.
A single series of small teeth in the upper jaw; the lower jaw with a sharp front margin	3. Myxus, p. 466.

1. MUGIL*.

Mugil, *Artedi, Genera,* p. 32.

Mouth more or less transverse, with the lateral cleft short; no true teeth in the jaws; anterior margin of the mandible sharp, sometimes ciliated. A division of the stomach extremely muscular.

Migratory fishes of all the temperate and tropical regions, passing a part of the year in the sea; feeding on organic substances which are mixed with the mud or sand.

It is very difficult to distinguish the single species of this genus from one another; fortunately the single characters appear to vary very little in the individuals of one and the same species; the most important are the number of the soft rays of the anal fin and of the scales, the more or less developed eyelids, the position and length of the fins, the form of the lips, of the cleft of the mouth, and of the maxillary bone, and finally the form of the body.

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* 1. Mugil plumieri, *Bl.* t. 396; *Cuv. & Val.* xi. p. 90; ?*Gay, Hist. Chile, Zool.* ii. p. 261.—Sphyræna plumieri, *Bl. Schn.* p. 110.—Atlantic coasts of Tropical America.—This species appears to be closely allied to *M. cephalus.* Valenciennes omits to give the number of the anal rays. 2.

When we find one or more of these characters omitted in the description of a species, it is nearly impossible to recognize it again and to distinguish it from the other allied forms; hence the great number of doubtful species in the foot-note. In speaking of a lateral line in my descriptions of these fishes, I apply this term only for convenience' sake, meaning that series of scales which runs from the upper angle of the operculum, above the pointed axillary scale, to the root of the caudal fin. I have found that the form of the cleft of the mouth offers an excellent specific character, measuring its breadth between the two angles of the mouth, and calling its depth the vertical drawn from the extremity of the symphysis of the mandibles on the transverse line joining the two angles of the mouth.

The anatomy of *Mugil* shows several remarkable peculiarities. The following details are taken from *M. septentrionalis.*

Pharyngeal apparatus.—The fishes of this genus feed on organic substances which are mixed up with the sand or mud; a considerable indigestible portion of the latter is swallowed; and in order to prevent larger bodies from passing into the stomach, or substances

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2. Mugil albula, *L. Syst.* i. p. 520, *from Catesb. South Carol.* ii. pl. 5; *Mitch. Lit. & Phil. Trans. New York*, i. p. 447; *Cuv. & Val.* xi. p. 94; *Dekay, New York Fauna, Fishes*, p. 146.—Atlantic coasts of the United States.—This species, if really different, has never been completely described.
3. —— breviceps, *Cuv. & Val.* xi. p. 106.—Gorea.
4. —— borbonicus, *Cuv. & Val.* xi. p. 113.—Bourbon.
5. —— cylindricus, *Cuv. & Val.* xi. p. 132; *Bleek. Sumatra*, ii. p. 266.—Sea of Batavia and Sumatra.
6. —— cascasia, *Buch. Ham. Fish. Gang.* pp. 217, 380; *Cuv. & Val.* xi. p. 145. Rivers of North Bengal.
7. —— carinatus, (*Ehrenb.*) *Cuv. & Val.* xi. p. 148.—Red Sea. Indian Ocean.
8. —— scheli, *Forsk.* p. 73; *Cuv. & Val.* xi. p. 152.—Red Sea.
9. —— tade, *Forsk.* p. 74; *Cuv. & Val.* xi. p. 153.—Red Sea.
10. —— buchanani, *Bleek. Verhand. Batav. Genootsch.* xxv., *Beng. en Hindost.* p. 99.—Rivers near Calcutta.
11. —— valenciennesii, *Bleek. Natuurk. Tydschr. Nederl. Ind.* 1858, xvi. p. 277. East Indian Archipelago.
12. Bontah, *Russ.* ii. p. 64. pl. 180.
13. Peddaraki, *Russ.* ii. pl. 182.—Mugil pedaraki, *Cuv. & Val.* xi. p. 137.—Coast of Coromandel.
14. Mugil acutus, *Cuv. & Val.* xi. p. 140.—Australia.
15. —— melancranus, *Richards. Ichth. China*, p. 248.—*Hab.* ——?
16. —— ventricosus, *Richards. Ichth. China*, p. 249.—China.
17. —— chaptalii, *Eyd. & Soul. Voy. Bonite, Zool.* i. p. 171. pl. 4. fig. 1 (bad). Sandwich Islands.
18. —— lauvergnii, *Eyd. & Soul. l. c.* p. 174. pl. 4. fig. 3 (bad).—China.
19. —— grandisquamis, *Cuv. & Val.* xi. p. 103.—Gambia.
20. —— parmatus, *Cant. Catal.* p. 94.—Pinang.
21. —— berlandieri, *Girard in U. S. & Mex. Bound. Surv. Fishes*, p. 20. pl. 10. figs. 1–4 (bad).

from passing through the gill-openings, these fishes have the organs of the pharynx modified into a filtering apparatus. These fishes take in a quantity of sand or mud, and after having worked it for some time between the pharyngeal bones, they eject the roughest and indigestible portion of it. The upper pharyngeals have a rather irregular form; they are slightly arched, the convexity being directed towards the pharyngeal cavity, tapering anteriorly and broad posteriorly. They are coated with a thick soft membrane, which reaches far beyond the margin of the bone, at least on its interior posterior portion; this membrane is studded all over with minute horny cilia. The pharyngeal bone rests upon a large fatty mass, giving it a considerable degree of elasticity. There is a very large venous sinus between the anterior portion of the pharyngeal and the basal portion of the branchial arches. Another mass of fat, of elliptical form, occupies the middle of the roof of the pharynx, between the two pharyngeal bones.

Each branchial arch is provided on each side, in its whole length, with a series of closely-set lamellæ (*rakers*), which are laterally bent downwards, each series closely fitting to the series of the adjoining arch; they constitute together a sieve admirably adapted to permit a transit for the water, retaining at the same time every other substance in the cavity of the pharynx.

The lower pharyngeal bones are elongate, crescent-shaped, and broader posteriorly than anteriorly. Their inner surface is concave, corresponding to the convexity of the upper pharyngeals, and provided with a single series of lamellæ, similar to those of the branchial arches, but reaching across the bone from one margin to the other.

Internal parts.—The lower portion of the œsophagus is provided with numerous long thread-like papillæ, and continued into the oblong-ovoid membranaceous cæcal portion of the stomach, the mucosa of which forms several longitudinal folds. The second portion of the stomach reminds one of the stomach of birds; it communicates laterally with the other portion, is globular, and surrounded by an exceedingly strong muscle. This muscle is not divided into two, as in birds, but of equal thickness in the whole circumference of the stomach, all the muscular fasciculi being circularly arranged. The internal cavity of this stomach is rather small, and coated with a tough epithelium, longitudinal folds running from the entrance-opening to the pyloric, which is situated opposite to the other. Where the epithelium ceases, there commences the mucous membrane of the intestine with a low circular valve, thus forming a sort of pylorus. There are five rather short pyloric appendages. The intestines make a great number of circumvolutions; they are seven feet long in a specimen thirteen inches in length. The peritoneal folds are filled with innumerable small lobes of fat, enveloping and covering the intestinal tract. The peritoneum is black. The liver is of moderate size, its greater portion being situated on the left side; gall-bladder large, free, and not imbedded in the substance of the liver. The ovaries are large and long, containing an exceedingly large number of apparently nearly mature eggs (month of February), arranged in a great many laminæ. They have a separate opening immediately behind the vent.

The air-bladder is large, simple, with its membranes thin; portions of the abdominal muscles project into the lateral anterior part of its cavity.

Skeleton.—The form of the skull is obtusely conical; the bones are well ossified, with the sutures between them conspicuous. The upper surface of the head is broad and convex, with scarcely any channels for the muciferous system. The hind part of the occipital region is produced backwards, and deeply depressed below the level of the crown; it is provided with a high crest, the upper margin of which is not elevated above the level of the frontal bones: there are two pairs of lateral ridges; the outer is very irregular, curved in a ʃ-like line, its anterior convexity being above the orbit; the intermediate crest is transformed into a horizontal flexible and slightly dilated process of the paroccipital, extending backwards or between the two branches of the suprascapula and to each side of the vertebral column. The lateral portions of the crown are impressed, each impression being divided into an anterior and posterior portion by the outer crest. There are two deep lateral incisions on each side behind the upper angle of the orbit, separated from each other by a long process of the postfrontal pointing outwards; the posterior is formed by a prominent portion of the epitympanic and by the postfrontal, and filled up by muscles, whilst the anterior receives the hindmost infraorbital bone. Ethmoid broad, cartilaginous. Præfrontal rather small, smaller than the turbinal; turbinal bones broad, widely separate from each other; præorbital subquadrangular, the other infraorbitals feeble and very narrow. The maxillary is subcylindrical, not dilated at its extremity, slightly ∿-like curved: the intermaxillary has a broad short triangular posterior process, and is somewhat dilated at its extremity; its anterior margin is provided with a series of setiform bony fringes. The articulary of the mandible is vertically elevated, whilst the dentary is flattened into a horizontal broad lamella with a sharp anterior margin; the bony fibres of which it is composed are more coherent than in the upper jaw. Vomer anchor-shaped; palatine feeble and very narrow. The form of the opercles may be seen externally, and we only mention that the præoperculum is provided with a rudimentary muciferous channel.

The suprascapula is composed of two processes, one being nearly thrice as long as the other; the scapula is very short; cavity for the pectoral muscles deep, not very broad; ulna with a rather small ovate foramen; a wide slit between radius and humerus; carpal bones exceedingly short; coracoid well developed.

Pubic bones elongate, flat; they are not in immediate connexion with the humeral arch, but suspended from the coracoids by a ligament which is fixed near the root of the fins.

There are eleven abdominal and thirteen caudal *vertebræ*, the length of the former portion of the vertebral column being to that of the latter as 1 : 1·05. The vertebræ are slightly compressed, of moderate length; the abdominal vertebræ have strong and broad parapophyses, from which the slender ribs are suspended. The neural spines of the first seven vertebræ are short, and dilated into more or less confluent lamellæ; the first interneural is spatulate, with a ridge on each side, and attached to the seventh vertebra. The other neural and hæmal spines are slender and rather short; two or three interneurals of the second dorsal and two or three interhæmals correspond to one neural or hæmal; the first two interneurals of the second dorsal fin are behind the apophysis of the thirteenth vertebra.

	lines.
Length of the first vertebra	4
——— of the sixth and twelfth vertebræ	5
——— of the twenty-third vertebra	$3\frac{1}{2}$
——— of the abdominal portion	56
——— of the caudal portion	59

Synopsis of the Species.

I. Orbit with the adipose eyelid well developed, covering at least a third of the iris posteriorly. Upper lip not very thick.

A. Anal fin with eight soft rays.

a. L. lat. 40–45.

α. The maxillary is entirely hidden, or only a narrow lateral stripe of it is visible.

* Mandibulary angle obtuse; pectoral above the middle of the body . . . . 1. M. cephalus.

* Mandibulary angle obtuse; pectoral on the middle of the body . . . . 2. M. lineatus.

* The mandibulary angle is a right one; the height of the body is one-fourth of the total length. 3. M. constantiæ.

* The mandibulary angle is a right one; the height of the body is one-fifth of the total length; the anterior dorsal spine is on the middle, between snout and base of the caudal fin . . . . 4. M. cephalotus.

* The mandibulary angle is a right one; the height of the body is one-fifth of the total length; the anterior dorsal spine is nearer to the snout than to the base of the tail. 5. M. rammelsbergii.

* The mandibulary angle is acute . 6. M. dobula.

β. The extremity of the maxillary is not hidden by the præorbital . . . . 7. M. hæmatochilus.

(*γ.* The upper lip is obliquely truncated below the snout. 8. M. perusii.)

b. L. lat. 32–35 . . . . 9. M. liza.

c. L. lat. 30 . . . . 10. M. subviridis.

B. Anal fin with nine soft rays.
  a. L. lat. 26–28.
    α. The height of the body is one-fifth of the total length. 11. M. nepalensis.
    β. The height of the body is one-fourth of the total length. 12. M. argenteus.
  b. L. lat. 30–32. The height of the body is more than one-fifth of the total length; extremity of the maxillary visible; the origin of the second dorsal fin is above the middle of the anal. 13. M. sundanensis.
  c. L. lat. 33–35.
    α. The extremity of the maxillary is visible.
      * The upper profile is curved; the pectoral fin is longer than the head, the length of the snout not included, and extends to, or beyond, the origin of the dorsal fin. 14. M. strongylocephalus.
      * The upper profile is curved; the height of the body is more than one-fifth of the total length; the pectoral does not extend to the dorsal . . . . . 15. M. parsia.
      * The upper profile is curved; the height of the body is rather less than one-fifth of the total length; the pectoral is shorter than the head, the length of the snout not included. 16. M. belanak.
      * The upper profile is straight; the interorbital space entirely flat . . . . 17. M. planiceps.
    β. The maxillary is entirely hidden.
      * Pectoral as long as the entire head. 18. M. longimanus.
      * Pectoral somewhat shorter than the head and extending to the dorsal; snout as long as the eye. 19. M. kelaartii.
      * Pectoral as long as the head, the extent of the snout not included; snout shorter than the eye; the height of the body is one-fifth, or less than one-fifth, of the total length. 20. M. engeli.
      * Pectoral as long as the head, the length of the snout not included; the height of the body is more than one-fifth of the total length . . . . 21. M. cantoris.
  d. L. lat. 36–38.
    α. The maxillary is entirely hidden, or only a narrow lateral stripe of it is visible.
      * The mandibulary angle is a right one. 22. M. brasiliensis.
      * The mandibulary angle is obtuse. 23. M. robustus.
    β. The extremity of the maxillary is visible.
      * Pectoral much shorter than the head. 24. M. affinis.
      * Pectoral nearly as long as the head. 25. M. ophuysenii.
  e. L. lat. 40–43.
    α. Dorsal and anal fins not scaly . . 26. M. cunnesius.
    β. Dorsal and anal fins scaly. . . . 27. M. speigleri.

II. Adipose eyelid not developed. Upper lip not particularly thick.
  A. Anal fin with eight soft rays.
    a. L. lat. 26–27 . . . . 28. M. waigiensis.
    b. L. lat. 40.
      α. Caudal edged with black . . . . 29. M. suppositus.
      β. Caudal without a black edge.
        * The height of the body is rather less than one-fifth of the total length . . . . 30. M. octo-radiatus.
        * The height of the body is one-fourth of the total length. 31. M. curtus.
  B. Anal fin with nine soft rays.
    a. L. lat. 45–46.
      α. Snout broad and depressed; mandibulary angle obtuse; the free space at the chin is elongate, cuneiform, obtusely rounded anteriorly; the width of the interorbital space is contained twice and two-thirds in the length of the head. 32. M. capito.
      β. Snout moderately broad; the width of the interorbital space is nearly one-third of the length of the head; the height of the body is contained four times and a half in the total length. 33. M. richardsonii.
      γ. The snout is broad; the width of the interorbital spaco is two-fifths of the length of the head . 35. M. auratus.
      δ. Snout somewhat tapering anteriorly; the width of the interorbital space is one-third of the length of the head; the height of the body is contained five times and a half in the total length . . . . 36. M. saliens.
      ε. Snout rather produced, as long as the interorbital space is broad, the width of the latter being contained twice and three-fourths in the length of head; height of the body more than one-fifth of the length of body . . . 37. M. multilineatus.
      (ζ. The nasal bones cover the upper lip. 38. M. cryptochilus.)
    b. L. lat. 42–43 . . . . 39. M. axillaris.
    c. L. lat. 38–39.
      α. Maxillary entirely hidden . . . . 40. M. cæruleomaculatus.
      β. Extremity of the maxillary visible . 41. M. bleekeri.
    d. L. lat. 32–35.
      α. Maxillary entirely hidden. . . . 42. M. ceylonensis.
      β. Extremity of the maxillary visible.
        * One-third of the anal is before the soft dorsal fin; the first dorsal spine stands exactly on the middle between the base of caudal and the end of snout. 43. M. smithii.
        * One-third of the anal is before the soft dorsal fin; the first dorsal spine is nearer to the base of the caudal fin than to the end of the snout . . . . 44. M. troschelii.
        * Nearly the entire anal fin is before the soft dorsal fin. 45. M. borneensis.

e. L. lat. 28–30.
α. Maxillary hidden . . . . 46. M. ceramensis.
β. Extremity of the maxillary visible. 49. M. compressus.
f. L. lat. 23–26.
α. Maxillary hidden . . . . 47. M. oligolepis.
β. Extremity of the maxillary visible.
* L. transv. 8. . . . . 48. M. hypselopterus.
* L. transv. 10 . . . . 50. M. melinopterus.
C. Anal fin with ten soft rays.
a. Maxillary hidden . . . . 51. M. decemradiatus.
b. The extremity of the maxillary is visible.
α. No pointed scale in the axil . . . 52. M. peronii.
β. A pointed scale in the axil . . . 34. M. petherici.
D. Anal fin with eleven soft rays . . . 53. M. falcipinnis.

III. The upper lip is very thick.
A. Eye with an adipose membrane . . . 54. M. broussonetii.
B. Anal fin with eleven soft rays. . . . 55. M. labeo.
C. Anal fin with nine or ten soft rays; eye without adipose membrane.
a. Cleft of the mouth broader than deep.
α. Upper lip with a transverse fold. . 56. M. labiosus.
β. The upper lip alone is fringed or papillary.
* Upper lip with three series of short, broad papillæ; the pectoral extends to the thirteenth scale of the lateral line. 57. M. chelo.

* Upper lip with two series of short and broad papillæ; the pectoral extends to the tenth scale of the lateral line. 58. M. septentrionalis.

* Upper lip with seven series of small, very distinct papillæ. Body with black streaks . . . 59. M. nigrostrigatus.

* Upper lip with obtuse, indistinct papillæ. Body not black-striped. . . . . 60. M. heterochilus.

γ. Both lips are fringed or papillary.
* A. $\frac{3}{9}$. The maxillary is entirely hidden; the height of the body is contained four times and a third in the total length. 61. M. crenilabis.

* A. $\frac{3}{9}$. The height of the body is contained five times and a fourth in the total length; præorbital not notched. 62. M. macrochilus.

* A. $\frac{3}{9}$. Extremity of maxillary not covered by the præorbital, which has a distinct notch . . 63. M. rüppellii.
* A. $\frac{3}{10}$ . . . . 64. M. cirrhostoma.
b. Cleft of the mouth deeper than broad. 65. M. proboscidens.

IV. Snout flat, rounded, with the upper part projecting beyond the mouth . . . . 66. M. corsula.

1. **Mugil cephalus.**

Cefalo (Rome); Cievolo (Venice); Carida (Nice); Bouri, Bouria (Egypt, Tunis).
Κέφαλος, *Arist. Hist. Anim.* v. c. 11, vi. c. 17, viii. c. 2 & 19.
Cephalus, *Rondel.* ix. c. 5. p. 260; *Gesner, Aquat.* iv. p. 549.
Cestreus, sp. 1, *Klein, Hist. Pisc. Miss.* v. p. 23.
Mulet-Cabot, *Duhamel, Pêches,* iii. sect. 6. cap. 2. p. 146.
Mugil tang, *Bl.* taf. 395 (very bad); *Bl. Schn.* p. 115. tab. 33. fig. 1, from *Bloch.*
—— cephalus, *Cuv. Règne Anim.*; *Risso, Ichth. Nice,* p. 343, and *Eur. Mérid.* iii. p. 388; *Bonap. Faun. Ital. Pesc.* (anal fin incorrect); *Cuv. & Val.* xi. p. 19. pl. 307; *Lowe, Proc. Zool. Soc.* 1843, p. 86; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 395; *Guichen. Explor. Algér. Poiss.* p. 67.
—— cephalus, var. A, *De la Roche, Ann. Mus.* xiii. p. 358. tab. 20. fig. 4.
On Mugil cephalus, *Bloch, cfr. Trosch. in Wiegm. Arch.* 1840, p. 278.

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{8}$. L. lat. 42. L. transv. 14–15. Cæc. pylor. 2. Vert. 12/12.

The height of the body is contained five times in the total length, the length of the head four times and a half. The head is very slightly convex superiorly, and the width of the interorbital space is contained twice and one-third in the length of the head. The upper lip is not thick. The angle made by the two mandibulary bones is an obtuse one. The cleft of the mouth is not quite half as deep as broad (between the angles of the mouth). The maxillary is entirely covered by the præorbital. Eyes hidden behind a broad adipose membrane; nostrils rather distant from each other, the posterior being in the middle between the anterior and the orbit. The space at the chin between the mandibles is broadly lanceolate. The vertical fins are not scaly; the first two dorsal spines are half as long as the head: the pectoral extends to about the eighth scale of the lateral line*; its base is above the middle of the body: the ventral is inserted midway between the pectoral and spinous dorsal. Dark, shining stripes along the series of scales.

Mediterranean. Coast of Madeira. Nile. Freshwater lakes of Tunis. West coast of Africa.

a. Half-grown. River Niger. From Mr. Fraser's Collection.

2. **Mugil lineatus.**

Mugil lineatus, (*Mitch.*) *Cuv. & Val.* xi. p. 96; *Dekay, New York Fauna, Fishes,* p. 144. pl. 15. fig. 42 (bad).

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{8}$. L. lat. 40. L. transv. 13.

The height of the body is contained four times and two-thirds in the total length, the length of the head five times and one-third.

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* In speaking of a lateral line in the fishes of this genus, I mean by it that longitudinal series of scales which commences next above the pointed axillary scale.

The snout is not very broad and moderately depressed, with the lower profile ascending in the same curve in which the upper one descends. The interorbital space is slightly convex, its width being twice and a half in the length of the head. Eye with an adipose membrane. The nostrils are at some distance from each other, the posterior being in the middle between the anterior and the orbit. Lips thin; a narrow strip of the maxillary is not covered by the præorbital. The space at the chin, between the mandibularies, is rather broad and short, obtusely rounded anteriorly; the angle made by the anterior margins of the mandibles is obtuse. The length of the two anterior dorsal spines is somewhat more than one-half the length of the head. There are twenty-four scales between the snout and the spinous dorsal; the ninth, the twelfth, and the twenty-fifth scales of the lateral line correspond to the extremity of the pectoral fin and to the origin of the two dorsals. The root of the pectoral is on the middle of the depth of the body, and that of the ventral rather nearer to the origin of the dorsal than to the base of the pectoral. Dark stripes along the series of scales.

Atlantic coasts of the United States.

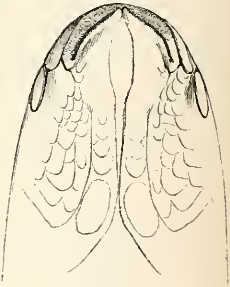
a. Half-grown: has been in chloride of zinc. North America. Purchased of Mr. Warwick.

3. **Mugil constantiæ.**

Cuv. & Val. xi. p. 107; *Smith, Ill. Zool. South Africa, Fishes,* pl. 28. fig. 1.

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{8}$. L. lat. 40. L. transv. 15.

The height of the body is one-fourth of the total length, the length of the head one-fifth. The head is very slightly convex superiorly, and the width of the interorbital space is not quite one-half the length of the head. The upper lip is not thick. The angle made by the two mandibulary bones is a right one. The cleft of the mouth is half as deep as it is broad; the maxillary is entirely hidden below the præorbital. Eyes with an adipose membrane; nostrils rather distant from each other, the posterior being in the middle between the anterior and the orbit. The space at the chin between the mandibles is broadly lanceolate. Vertical fins not scaly. The first two dorsal spines are longer than one-half of the head. The ninth, the eleventh or twelfth, the twenty-third or twenty-fourth scales of the lateral line correspond to the extremity of the pectoral and to the origin of the two dorsal fins. The root of the pectoral is above the middle of the body, and the ventral is inserted nearer to the vertical


M. constantiæ.

from the dorsal fin than to the base of the pectoral. Shining stripes along the series of scales.

Fresh waters of the Cape of Good Hope.

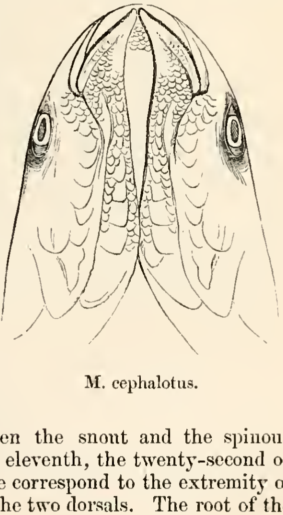
a. Twenty-one inches long: stuffed. Cape. From Sir A. Smith's Collection.
b. Half-grown. Cape.—The upper lip of this specimen is slightly villose, as is shown in the woodcut.
c, d. Adult and half-grown: stuffed. Cape.
e. Young. Cape. Presented by Sir A. Smith.
f. Adult: stuffed. From the Collection of the East India Company.

4. Mugil cephalotus.

? *Renard,* i. pl. 2. fig. 10; *Valent.* p. 458. no. 356.
Mugil öur, *Forsk.* p. xiv. no. 109. var. γ; *Rupp. N. W. Fische,* p. 131.
—— cephalotus, *Cuv. & Val.* xi. p. 110 (not synon.); *Cant. Ann. & Mag. Nat. Hist.* ix. 1842, p. 484 (not *Catal. Mal. Fishes*); ? *Eyd. & Soul. Voy. Bonite, Zool.* i. p. 175. pl. 4. fig. 4 (bad).
—— japonicus, *Schleg. Faun. Japon. Poiss.* p. 134. pl. 72. fig. 1 (bad); *Richards. Ichth. Chin.* p. 247; *Bleek. Verhand. Batav. Genootsch.* xxv., *Japan,* p. 41.
—— macrolepidotus, *Richards. Ichth. Chin.* p. 249 (not *auct.*).

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{(7)\,8}$. L. lat. 38–40. L. transv. 14–15.

The height of the body is nearly equal to the length of the head, and one-fifth of the total. The snout is moderately broad, the width of the interorbital space being contained twice and a half to twice and four-fifths in the length of the head. Eye with a broad adipose membrane. The nostrils are at some distance from each other, the posterior being in the middle between the anterior and the orbit. Lips thin; the præorbital covers entirely the maxillary. The cleft of the mouth is not twice as broad as it is deep. The space at the chin, between the mandibularies, is broadly lanceolate; the angle made by the anterior margins of the mandibles is a right one. The length of the anterior dorsal spines is rather more than one-half of that of the head; they occupy the middle of the distance between snout and root of the caudal. There are twenty-one scales between the snout and the spinous dorsal fin; the eighth, the tenth or eleventh, the twenty-second or twenty-third scales of the lateral line correspond to the extremity of the pectoral fin and to the origin of the two dorsals. The root of the



M. cephalotus.

pectoral is above the middle of the body, and that of the ventral midway between base of the pectoral and spinous dorsal. Shining stripes along the series of scales.

Red Sea. Coast of Pondicherry. Chinese and Japanese Seas.

a. Adult. Amoy.
b, c, d, e. Adult and half-grown. China.
f. Adult. China. Presented by Sir J. Richardson as *M. macrolepidotus*.
g. Adult: stuffed. China. Presented by J. R. Reeves, Esq.
h. Half-grown. Chusan. Presented by the East India Company.
i, k, l, m. Adult and half-grown. From the Haslar Collection.
n. Half-grown: skeleton. Chusan. Presented by the East India Company.

The woodcut is taken from specimen *a*.

5. Mugil rammelsbergii.

Mugil rammelsbergii, *Tschudi, Faun. Peruan. Ichthyol.* p. 20.
—— liza, *Gay, Hist. Chil. Zool.* ii. p. 256. lam. 4 *b*. fig. 2 (not good).

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{8}$. L. lat. 40. L. transv. 13.

The height of the body is nearly equal to the length of the head, and one-fifth of the total. The snout is moderately broad, the width of the interorbital space being two-fifths of the length of the head. Eye with a broad adipose membrane. The nostrils are at some distance from each other, the posterior being somewhat nearer to the orbit than to the anterior. Lips thin; the præorbital covers entirely the maxillary. The cleft of the mouth is not twice as broad as it is deep. The space at the chin, between the mandibularies, is broadly lanceolate. The angle made by the anterior margins of the mandibles is a right one. The length of the anterior dorsal spines is rather less than one-half the length of the head; they stand somewhat nearer to the end of the snout than to the base of the tail. There are twenty-one scales between the snout and the spinous dorsal fin; the ninth, the twelfth, and the twenty-fifth scales of the lateral line correspond to the extremity of the pectoral fin and to the origin of the two dorsals. The root of the pectoral is above the middle of the body, and that of the ventral midway between base of the pectoral and spinous dorsal.

Months of May and October on the coast of the island of S. Lorenzo (Tschudi). Coast of Chile.

a. Half-grown. Chile. From Mr. Bridges' Collection.—'Muchuto.'

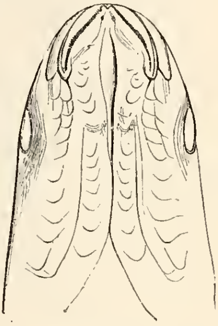
6. Mugil dobula.

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{8}$. L. lat. 40–42. L. transv. 14.

Eyes with a broad adipose membrane; the maxillary is nearly entirely hidden by the præorbital; the angle made by the anterior margins of the mandibulary bones is acute. The pectoral does not extend on to the spinous dorsal.

Australia. Aneiteum.

a–b. Adult: skins. Perth Water, Western Australia.
c–e. Adult: stuffed. Australia.
f. Nine inches long. Australia. From Mr. Macgillivray's Collection.
g. Six inches long. Australia. From Mr. Macgillivray's Collection.
h, i. Fine specimens. From the Haslar Collection.
k. Half-grown: stuffed. Fresh waters of Aneiteum. From Mr. Macgillivray's Collection.



M. dobula.

Description.—The height of the body equals the length of the head, and is one-fifth of the total. The young specimen has the body somewhat more slender. The least depth of the tail is two-fifths of the length of the head. The lower profile of the head is rather more convex than the upper; the greatest depth of the head, above the posterior margin of the operculum, is three-quarters of its length; the interorbital space is slightly convex, and contained twice and a third in the length of the head. The snout is broad, moderately depressed, and longer than the eye; lips thin; the maxillary is a little longer than the intermaxillary, and becomes just visible behind the angle of the mouth; the præorbital is not emarginate, and minutely denticulated at its anterior edge and at its extremity, which is obliquely truncated. The cleft of the mouth is one-fourth broader than it is deep; the margins of the mandibulary bones form an acute angle anteriorly; the space at the chin, between the mandibles and interopercles, is elongate-lanceolate. Both lips are provided with a series of minute cilia. There is a deep cavity in front of the vomer. The nostrils are distant from each other, and the posterior is somewhat nearer to the orbit than to the anterior. The eye is surrounded by a broad adipose membrane nearly entirely covering the iris. There are three series of somewhat deciduous scales between the eye and the præopercular margin; the angle of the præoperculum is rather produced posteriorly; there are three pores on its inferior margin and two on its posterior.

The pectoral fin is inserted somewhat above the middle of the body, and extends to the tenth scale of the lateral line; it is shorter than the head (the snout not included); the root of the ventral is midway between base of the pectoral and dorsal. There are twenty-two or twenty-four scales between the snout and the spinous dorsal. The origin of the latter corresponds to the twelfth scale of the lateral line, and is exactly in the middle between snout and base of the caudal; the length of the first spine is one-half, or a little more than one-half, of that of the head. The distance between the origins of the two dorsal fins is nearly equal to the length of the head. The soft dorsal is considerably higher than long, as high as the spinous, and has the upper edge slightly emarginate; a few scales cover the anterior rays. Caudal forked. The anal commences a little before the opposite dorsal fin, is higher than long, rather higher, and not more scaly, than the dorsal. Pointed scales of moderate length in the axil of the first dorsal, of the pectoral, and of the ventral. Colour greenish shining golden; fins minutely dotted with blackish.

7. Mugil hæmatochilus.

Mugil hæmatocheilus, *Schleg. Faun. Japon. Poiss.* p. 135. pl. 72. fig. 2; *Bleek. Verhand. Batav. Genootsch.* xxvi., *Japan*, p. 107.
—— xanthurus, *Richards. Ichthyol. Chin.* p. 248.

D. $4 \left| \frac{1}{8} \right.$. A. $\frac{3}{8}$. L. lat. 42.

The height of the body is contained five times and a half to five times and three-quarters in the total length, the length of the head five times. Eye with a broad adipose membrane anteriorly and posteriorly; the præorbital is slightly emarginate, and does not cover the extremity of the maxillary. The upper lip is rather broad. The spinous dorsal fin is rather higher than the soft, which, like the anal, is scaly; the anal commences somewhat before the opposite dorsal fin, and is nearly as high as long. The pectorals are shorter than the head, the length of the snout not included.

Coasts of Japan and China.

a. Half-grown: stuffed. China. Presented by J. R. Reeves, Esq.

Sir J. Richardson (*l. c.* p. 249) also mentions a *M. hæmatocheilus*, referring this name to one of Reeves's drawings. On comparing the latter, it becomes at once evident that a species very different from *M. hæmatochilus* has been represented—a species which appears to have eleven anal rays. The figure named by Sir J. Richardson *M. xanthurus* is evidently the *M. hæmatocheilus* of the 'Fauna Japonica,' and it is not improbable that the stuffed specimen mentioned is the original of that figure. We would observe, however, that the drawings of *Mugil* on which Sir J. Richardson has founded several species may be true representations of the natural coloration (a character of very little importance in this genus), but that none of them show the natural form of the mouth of a Mugil, and that the numbers of the fin-rays and scales cannot be depended upon.

8. Mugil perusii.

Cuv. & Val. xi. p. 116.

This species appears to be very distinct. We extract the following characters from the scanty description given by Valenciennes:—

D. $4 \left| \frac{1}{8} \right.$. A. $\frac{3}{8}$.

The height of the body is contained four times and a half in the total length. Eyes with an adipose membrane; head less broad than in *M. cephalus*; forehead convex. The upper lip is thick, without teeth or cilia, and appears to be obliquely truncated below the snout ("paraît comme coupée obliquement sous le museau"). The pectoral is shorter than the head, and has a very long and pointed scale in its axil; the second dorsal and the anal are scaly. Caudal emarginate. Pectoral blackish.

Vanicolo.

9. Mugil liza.

? Harder, *Marcgr.* p. 166.
? Parati, *Marcgr.* p. 181.
Queriman, *Hancock in Lond. Quart. Journ. Sc.* 1830, p. 125.
Mugil liza, *Cuv. & Val.* xi. p. 83; *Jenyns, Zool. Beagle, Fishes,* p. 80.

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{8}$. L. lat. 32–35. L. transv. 13. Cæc. pylor. 2.

The height of the body is one-sixth of the total length, the length of the head one-fifth. The eye is hidden behind an adipose membrane. The maxillary is entirely covered by the præorbital. The second dorsal and the anal fins are scaleless.

Atlantic coasts of Tropical America.

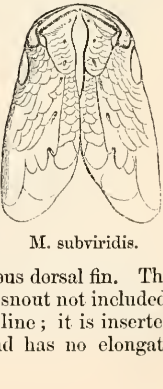
a–b. Adult: stuffed and skin. West Indies.
c. Adult: stuffed. British Guiana. Presented by Sir R. Schomburgk.

10. Mugil subviridis.

Cuv. & Val. xi. p. 115.

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{8}$. L. lat. 30. L. transv. 11.

The height of the body is contained four times and a half in the total length, the length of the head five times and a third. Adipose eyelids well developed. The least depth of the tail is contained once and two-thirds in the length of the head. The interorbital space is flat, and its width is contained twice and a fourth in the length of the head. Snout broad, obtuse, depressed, as long as the eye; its anterior margin is formed by the upper lip, which is moderately thick. The angle made by the anterior margins of the mandibulary bones is very obtuse, and the cleft of the mouth is at least thrice as broad as it is deep. The free space at the chin, between the two mandibles, is rather short, cuneiform. The maxillary is bent downwards behind and below the angle of the mouth, where its extremity is visible; the præorbital is angularly bent, with the extremity subtruncated and denticulated. There are eighteen scales between the snout and the spinous dorsal fin. The pectoral is shorter than the head, the length of the snout not included, and extends to the seventh scale of the lateral line; it is inserted above the middle of the depth of the body, and has no elongate



M. subviridis.

pointed scale in its axil. The eleventh and the twentieth scales of the lateral line correspond to the origin of the dorsal fins; the soft dorsal and the anal fins are scaly; nearly the whole of the anterior half of the latter is before the origin of the opposite dorsal fin. Caudal emarginate. Greenish shining golden.

Coast of Malabar. Madras.

a. Half-grown. Madras. Presented by T. C. Jerdon, Esq.

11. Mugil nepalensis.

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 29. L. transv. 11.

The height of the body is contained five times in the total length, the length of the head five times and a half; the latter equals the length of the caudal fin. An adipose membrane covers a portion of the iris anteriorly and posteriorly. The upper profile, from the dorsal to the forehead, is nearly straight. The interorbital space is flat, and its width is three-sevenths of the length of the head. The upper lip is moderately thick, and forms the front margin of the snout. The anterior margins of the two mandibulary bones form an obtuse angle, and the cleft of the mouth is very much broader than deep. The præorbital is scaly, angularly bent, and has its extremity obliquely truncated and indistinctly denticulated. The extremity of the maxillary is conspicuous behind and below the mouth. There are sixteen series of scales between the spinous dorsal and the snout. The pectoral extends to the seventh scale of the lateral line, and is a little shorter than the head, the length of the snout not included; it has no elongate scale in its axil. The anterior dorsal commences above the tenth scale of the lateral line, a little nearer to the snout than to the base of the caudal fin; its anterior spines are stout, nearly equal in length, and scarcely more than half the length of the head; there is an elongate pointed scale at its base. The soft dorsal and the anal are enveloped in scales, and lower than the spinous dorsal; the former commences above the nineteenth scale, or above the anterior third of the anal fin. Caudal slightly emarginate.

Fresh waters of Nepal.

a. Eight inches long: skin. Nepal. Presented by B. H. Hodgson, Esq.

12. Mugil argenteus.

Mugil argenteus, *Quoy & Gaim. Voy. Uran. Poiss.* p. 338. pl. 59. fig. 3 (very bad).
—— ferrandi, *Cuv. & Val.* xi. p. 142.

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 28. L. transv. 10.

The height of the body is contained four times in the total length, the length of the head four times and two-thirds, the caudal fin nearly five times. An adipose membrane covers one-half of the iris anteriorly and posteriorly. The upper profile is strongly arched. The interorbital space is flat, and its width is two-fifths of the length of the head. The snout is rather broad, shorter than the eye, the upper lip being moderately thick, truncated, and forming its front margin. The anterior margins of the two mandibulary bones form an obtuse angle, and the cleft of the mouth is thrice as broad as it is deep. The free space at the chin, between the mandibles, is narrow, elongate, lanceolate; the maxillary is entirely hidden; the præorbital with a notch anteriorly, and with the extremity truncated. There are eighteen scales between the snout and the dorsal. The pectoral is as long as the head, the length of the snout not included, and extends to the ninth scale of the lateral line; it is inserted somewhat above the middle of the depth of the body, and has no elongate scale in its axil. The spinous dorsal commences nearer to the tail than to the extremity of the snout, above the tenth scale of the lateral line. The second dorsal commences above the twentieth scale, or above the middle of the anal fin; both fins are scaleless. Dorsal and anal fins are of equal height, much lower than the tail between them. Caudal emarginate, black-edged.

Port Jackson. South Australia.

a. South Australia. From Mr. Dring's Collection.

13. **Mugil sundanensis.**

Mugil sundanensis, *Bleek. Sumatra*, ii. p. 265; *Atl. Mugil.* tab. 1. fig. 1; *Act. Soc. Sc. Indo-Nederl.* vi., *Borneo*, xiii. p. 45.
—— brachysoma, *Bleek. Java*, iii. p. 399.

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 30–32.

The height of the body is contained four times and a sixth or four times and two-fifths in the total length, the length of the head five times; the least depth of the tail is more than one-half the length of the head. The adipose eyelid is well developed. Snout convex, as long as the eye. The præorbital has a very distinct notch anteriorly, and does not cover the end of the maxillary; upper lip rather thick. Pectoral shorter than the head; the anterior half of the anal fin falls before the vertical from the origin of the dorsal; caudal emarginate, black-edged. (*Bl.*)

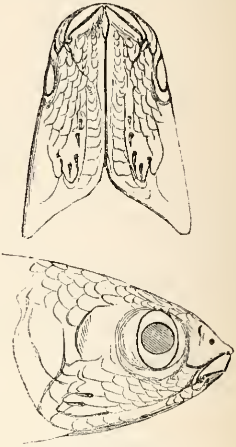
East Indian Archipelago.

14. **Mugil strongylocephalus.**

Richards. Ichth. China, p. 249.

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 33. L. transv. 11.

The height of the body is contained four times and two-thirds in the total length, the length of the head five times; the least depth of the tail is one-half or rather less than one-half the length of the head. Eye with a broad adipose membrane anteriorly and posteriorly. The interorbital space is very convex, and its width is two-fifths of the length of the head. The snout is obtusely conical, shorter than the eye, with the upper lip moderately thick, and situated obliquely below the front edge of the snout. The maxillary is bent downwards behind the angle of the mouth, a narrow portion of its extremity remaining visible when the mouth is closed; præorbital slightly emarginate anteriorly. The angle made by the anterior margins of the mandibulary bones is nearly a right one; the cleft of the mouth is more than twice as broad as it is deep; the mandibles cover nearly entirely the chin, leaving between them only a very short lanceolate free space. There are eighteen scales between the snout and the spinous dorsal; the tenth or eleventh and the twenty-first scales of the lateral line correspond to the origin of the dorsal fins. The pectoral is longer than the head, the length of the snout not included, and extends to, or slightly beyond, the origin of the dorsal; it is inserted somewhat above the middle of the depth of the body, and has a long pointed scale in its axil. The anterior third of the anal fin falls before the commencement of the opposite dorsal fin; both are scaly: caudal emarginate.



M. strongylocephalus.

Chinese Sea.

a. Type of the species. Hongkong. Presented by Sir J. Richardson.
b–c, d, e, f–h, i, k. Half-grown and young. China.

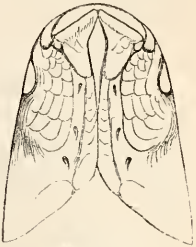
I am well aware of several differences between Sir J. Richardson's and my descriptions, and observe that both are taken from one and the same typical specimen.

15. Mugil parsia.

Mugil parsia, *Buch. Ham. Fish. Gang.* p. 215. pl. 17. fig. 71; *Cuv. & Val.* xi. p. 144; (not *Bleek.*).

D. 4 | $\frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 35. L. transv. 12.

The greatest depth of the body is below the origin of the first dorsal, and contained four times and a half in the total length, or once and four-fifths in the distance of the snout from the dorsal; the length of the head is one-fifth of the total. The least depth of the tail is a little more than one-half the length of the head. Snout short, broad, depressed, with the anterior margin acute, the upper lip being quite at its lower surface. The interorbital space is slightly convex, its width being contained twice and three-fourths in the length of the head. Lips thin; the maxillary is bent downwards behind the angle of the mouth, its extremity not being covered by the præorbital. The anterior margins of the mandibulary bones form a rather obtuse angle; the cleft of the mouth is more than twice as broad as it is deep; the space at the chin, between the mandibularies, is short, lanceolate. Eye with a very distinct posterior adipose membrane, which extends nearly to the pupil. There are twenty-one scales between the snout and the dorsal fin; the ninth, the eleventh, the twenty-second or twenty-third scales of the lateral line correspond to the extremity of the pectoral and to the origin of the two dorsal fins. The root of the pectoral is on the middle of the depth of the body, that of the ventral midway between base of the pectoral and dorsal. The soft dorsal and anal scaly; the origin of the dorsal is in the vertical from the third soft anal ray.



M. parsia.

Rivers of Bengal.

a, *b*. Types of the species. Presented by G. R. Waterhouse, Esq.

c. Bad state. Calcutta. From the Collection of Messrs. von Schlagintweit.

d. Bad state. Karrachi. From the Collection of Messrs. von Schlagintweit.

I have ascertained by dissection that the number of the soft anal rays is nine, and not eight as stated by Buchanan Hamilton. All the specimens of this species in the Collection of the British Museum are from four to five inches long. The species, perhaps, does not attain to a much larger size. The woodcut represents the head of one of the typical specimens magnified twice the natural size.

The fish called *M. parsia* by Bleeker has from forty to forty-five transverse series of scales, and therefore cannot be identical with our type.

16. **Mugil belanak.**

Mugil bontah, *Bleek. Natuurk. Tijdschr. Nederl. Ind.* xiii. p. 336, and xvi. p. 278; *Act. Soc. Sc. Indo-Nederl.* vi., *Borneo*, xiii. p. 49; (not *Russell*).

—— belanak, *Bleeker, Java*, iv. p. 337.

$$\text{D. } 4 \left| \tfrac{1}{8}. \right. \quad \text{A. } \tfrac{3}{9}. \quad \text{L. lat. } 33\text{–}35. \quad \text{L. transv. } 11.$$

The body is cylindrical anteriorly, and its height is contained five times and a quarter in the total length, and nearly equal to the length of the head. A posterior adipose membrane covers one-half of the iris. The upper profile is curved; the snout slightly convex, and not shorter than the eye. The præorbital has a deep notch anteriorly, and does not cover the extremity of the maxillary. The upper lip is rather thick. Dorsal and anal fins equal in height; pectoral shorter than the head, the length of the snout not included; caudal as long as the head, emarginate, brown-edged. (*Bl.*)

Coasts and rivers of the East Indian Archipelago.

17. Mugil planiceps.

Mugil planiceps, *Cuv. & Val.* xi. p. 122; *Bleek. Verhand. Batav. Genootsch.* xxv., *Bengal. en Hindost.* p. 101. tab. 1. fig. 5.
? Mugil dussumieri, *Cuv. & Val.* xi. p. 147.
Mugil cephalotus, *Cant. Catal.* p. 95.
—— dussumieri, *Bleek. Java,* iv. p. 339 (not *Journ. Ind. Archipel.* ii., *Ichth. Sumbawa,* p. 637).

D. 4 | $\frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 33–35. L. transv. 11. Cæc. pylor. 5.

The greatest depth of the body is nearly equal to the length of the head, and one-fifth of the total; the depth of the body below the origin of the spinous dorsal is contained twice and a third in the distance of the snout from the dorsal fin. The least depth of the tail is a little more than one-half of the length of the head. Snout much depressed, broad, and not very short. The interorbital space is quite flat, its width being contained twice and a third or twice and a half in the length of the head. Lips thin; the maxillary is bent downwards behind the angle of the mouth, its extremity not being covered by the præorbital. The space at the chin, between the mandibulary bones, is cuneiform. Eye with a narrow adipose membrane, which does not extend on to the pupil. There are twenty scales between the snout and the spinous dorsal. The eighth, the tenth or eleventh, the twenty-second or twenty-third scales of the lateral line correspond to the extremity of the pectoral and to the origin of the two dorsal fins. The soft vertical fins scaly; the origin of the dorsal is in the vertical from the third soft anal ray.

Coasts of Ceylon, Bengal, Hindostan, and China.

a. Fine specimen. Ceylon. Purchased of Mr. Cuming.
b–i. Adult and half-grown: stuffed. Calcutta.—(*M. macrops*, Blyth.)
k–o. Adult and young: skins. Sea of Pinang. Types of Dr. Cantor's *M. cephalotus*.
p. Half-grown: stuffed. China. From the Collection of the East India Company.
q. Half-grown. From the Haslar Collection.

18. Mugil longimanus.

Mugil cunnesius, *Bleek. Banka,* p. 454; *Act. Soc. Sc. Indo-Nederl.* viii., *Sumatra,* ix. p. 8; (not *Cuv. & Val.* or *Cant.*).

D. 4 | $\frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 35.

The height of the body is contained four times and two-thirds or five times in the total length, the length of the head five times or five times and a fourth. The width of the interorbital space is about one-half of the length of the head. Eye with an adipose membrane anteriorly and posteriorly. Snout very convex, with the upper lip rather thick. The maxillary is entirely hidden when the mouth is closed. The two dorsal fins and the anal are nearly equal in height; pectoral about as long as the head; caudal truncated.

East Indian Archipelago.

a. Half-grown. East Indies. Presented by G. R. Waterhouse, Esq.

19. Mugil kelaartii.

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 32–33. L. transv. 12.

The height of the body is contained four times and a half in the total length, the length of the head five times. Eye with a broad anterior and posterior adipose membrane. Snout as long as the orbit. The upper lip is rather thin, situated obliquely at the lower side of the snout. The pectoral fin extends to, or slightly beyond, the origin of the spinous dorsal, and is somewhat shorter than the head. The anterior third of the anal fin is before the soft dorsal. Maxillary entirely hidden.

Ceylon. Philippine Islands.

a. Four and a half inches long. Point de Galle. Presented by Sir A. Smith.

b. Four and a half inches long. Philippine Islands.

Description.—The body is compressed, its greatest depth being contained four times and a half in the total length; the least depth of the tail is one-half of the length of the head. The upper profile does not descend in so strong a curve as that in which the lower ascends. The interorbital space is convex, its width being two-fifths of the length of the head. The snout is as long as the eye, convex, with a somewhat sharp edge; the upper lip is entirely at its lower side. The angle made by the anterior margins of the mandibles is a right one, and the cleft of the mouth is a little more than twice as broad as it is deep; the free space at the chin, between the mandibles, is short, narrow, lanceolate. The maxillary is entirely hidden; the præorbital has a slight notch anteriorly and a rounded denticulated extremity. The nostrils are at some distance from each other, the posterior being in the middle between anterior and orbit. Eyelids very broad, covering the greater part of the iris.

The pectoral extends to the eleventh scale of the lateral line, to, or slightly beyond, the origin of the spinous dorsal, and is a little shorter than the whole head; it is inserted somewhat above the middle of the depth of the body, and has a long pointed scale in its axil. There are nineteen series of scales between the snout and the spinous dorsal fin. The latter commences in the middle of the distance between snout and base of the caudal, or in the vertical from the eleventh scale of the lateral line. The anterior dorsal spines are rather strong, three-fifths the length of the head. The second dorsal commences in the vertical from the fourth soft anal ray, or from the twenty-second scale; it is scaly, higher than long, nearly as high as the spinous dorsal, but lower than the anal. Caudal scaly, emarginate. Anal scaly, as long as the dorsal is high.

Greenish, shining silvery.

20. Mugil engeli.

Bleeker in Natuurk. Tijdschr. Nederl. Ind. xvi. p. 277, and in *Act. Soc. Sc. Indo-Nederl.* vii., *Sumatra,* viii. p. 78.

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 33–34. L. transv. 10–11.

The height of the body is contained five times or five times and two-thirds in the total length, the length of the head four times and a half to four times and three-fourths. The diameter of the eye is one-third or rather less than one-third of the length of the head, and contained once and a fourth in the width of the interorbital space. Eye with a broad anterior and posterior adipose membrane. Præorbital scaly, slightly emarginate, indistinctly denticulated. Snout obtuse, convex, shorter than the eye. The maxillary is entirely hidden; upper lip thin. There are eighteen scales between the snout and the anterior dorsal fin; an elongate scale in the axil. The least depth of the tail is two-fifths of the length of the head. The spinous dorsal fin is a little higher than the soft; spines rather slender, the first being the longest and strongest, as long as the portion of the head behind the orbit; it is somewhat nearer to the base of the caudal than to the extremity of the snout; the soft dorsal is much higher than long; the length of the pectoral equals the length of the head, the extent of the snout not included. The anterior half of the anal is before the vertical from the origin of the soft dorsal fin; the anal is scarcely higher than long, a little higher and much longer than the soft dorsal. Caudal fin slightly emarginate, two-ninths of the total length. Coloration uniform. (*Bl.*)

Coasts of Java, Sumatra, and Bali.

21. Mugil cantoris.

Bleeker in Verhand. Batav. Genootsch. xxv., *Beng. & Hindost.* p. 100. tab. 1. fig. 4.

D. $4 \mid \frac{1}{7\text{–}8}$. A. $\frac{3}{9\text{–}10}$. L. lat. 33.

The height of the body is contained four times and one-third to four times and two-thirds in the total length, the length of the head four times and a half to five times and a half. Interorbital space and snout convex; eye with an anterior and posterior adipose membrane; its diameter is contained thrice and one-third to thrice and two-thirds in the length of the head; the upper labial teeth are visible by the naked eye; a very shallow groove before the vomer; snout shorter than the eye, not projecting beyond the mouth. The præorbital has a very distinct notch anteriorly, and covers entirely the maxillary; upper lip thin. The dorsal fins are nearly equal in height, the posterior much higher than long; the length of the pectoral equals that of the head, the snout not included; the anal is scaly, commences before the vertical from the origin of the dorsal, is higher than long, and much longer than the soft dorsal fin; the scale in the axil is not much elongate. Caudal emarginate. (*Bl.*)

River Hooghly (Calcutta).

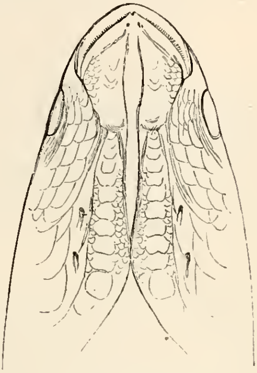
The specimens were from 68 to 130 millimetres long.

22. Mugil brasiliensis.

? Curema, *Marcgr.* p. 181; *Pison.* p. 70.
Mugil brasiliensis, *Agass. in Spix, Pisc. Bras.* p. 234. tab. 72 (not good).
? Mugil incilis, *Hancock in Lond. Quart. Journ. Sc.* 1830, p. 127.
Mugil curema, *Cuv. & Val.* xi. p. 87; *Gay, Hist. Chil. Zool.* ii. p. 259.
? Mugil petrosus, *Cuv. & Val.* xi. p. 89; *Gay, l. c.* p. 260.

D. $4 \left| \frac{1}{8} \right.$. A. $\frac{3}{9}$. L. lat. 36–38. L. transv. 12–13. Vert. 11/13.

The height of the body is contained four times and a half to four times and four-fifths in the total length, the length of the head five times. The snout is moderately broad, not convex, with the lower profile ascending in the same degree as the upper descends; the interorbital space is slightly convex, its width being contained twice and a third in the length of the head. Upper lip rather thick. The angle made by the two mandibulary bones is a right one; the præorbital tapers posteriorly, has the anterior margin finely serrated, and covers the maxillary, so that only a very narrow portion of it is visible on the side of the snout. Eyes hidden anteriorly and posteriorly by a broad adipose membrane; nostrils rather distant from each other, the posterior situated on the middle between the orbit and the extremity of the snout. The space at the chin, between the mandibles and the interopercula, is elongate, cuneiform. The second dorsal and the anal are enveloped in small scales. There are twenty-one scales between the snout and the anterior dorsal. The first two dorsal spines are more than half as long as the head. The ninth or tenth, the eleventh or twelfth, and the twenty-third scale of the lateral line correspond to the extremity of the pectoral fin and to the origin of the two dorsal fins. The root of the pectoral is above the middle of the body, and the ventral is inserted midway between pectoral and spinous dorsal; pectoral shorter than the head; caudal deeply emarginate. Shining stripes along the series of scales; often a blackish spot superiorly at the base of the pectoral. The soft dorsal and the caudal with blackish margins.



M. brasiliensis.

Atlantic coasts of Tropical America.

a–c. Half-grown. Playa Vicente (Vera Cruz). From M. Sallé's Collection.
d. Half-grown: bad state. West Indies. Purchased of Mr. Scrivener.
e. Fine specimen. St. Domingo. Purchased of Mr. Cuming.
f–q. Adult, half-grown, and young: skins. Jamaica. From Dr. Parnell's Collection.

r–s. Young. St. Vincent's. From Mr. Macgillivray's Collection.
t, u. Half-grown and young: not good state. British Guiana. Presented by Sir R. Schomburgk.
v–w, x–y, z, α. Adult and half-grown. From the Haslar Collection.
β. Adult. Surinam.
γ. Young. Caripe, Para. Presented by J. R. G. Smith, Esq.
δ. Adult. South America. Purchased of Mr. Brandt.
ε. Adult: skeleton. South America. Purchased of Mr. Brandt.

The *skeleton* does not differ materially from that of *M. septentrionalis*. The setiform fringes of the intermaxillary are very short.

23. **Mugil robustus.**

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 38. L. transv. 12.

The height of the body equals the length of the head, and is one-fifth of the total. Eye with a narrow adipose membrane anteriorly and posteriorly. The upper lip is rather thin, forming the front edge of the snout. The pectoral is a little shorter than the head, the length of the snout not included, and extends to the ninth scale of the lateral line. Maxillary entirely hidden.

Coast of Madagascar.

a. Seven inches long. Madagascar. Presented by Dr. J. E. Gray.

Description of the specimen.—The specimen is very thick, not much compressed, subcylindrical; its greatest depth is below the anterior dorsal fin, where it equals the length of the head, and is one-fifth of the total. The upper and lower profiles converge in a gentle curve, meeting at the snout, which is somewhat convex. The least depth of the tail is two-fifths of the length of the head. The interorbital space is very slightly convex, and its width is contained twice and a third in the length of the head. The snout is obtuse, as long as the eye, with the front margin occupied by the upper lip. The angle made by the margins of the two mandibles is obtuse, and the cleft of the mouth is thrice as broad as it is deep. The mandibles leave no free space, or a very narrow one, between them. The maxillary is entirely hidden in a deep groove between the præorbital and the intermaxillary; the præorbital has a slight notch anteriorly, and the extremity truncated and minutely denticulated. The nostrils are at some distance from each other, the posterior being in the middle, between anterior and orbit. The eyelids are narrow, but very distinct; they cover about a third of the iris anteriorly and posteriorly. The pectoral extends to the ninth scale of the lateral line, and is a little shorter than the head, the length of the snout not included; its insertion is rather above the middle of the depth of the body. There are twenty scales between the snout and the spinous dorsal. The latter commences in the middle of the distance between snout and the base of the caudal, or in the vertical from the twelfth scale of the lateral line. The anterior dorsal spines are not very strong, and half as long as the head. The second dorsal commences in the vertical from the second soft anal ray, or from the twenty-fourth scale; it is higher than long, as high as the spinous dorsal; series of small scales cover a part of the membrane between the rays. The caudal is deeply emarginate, the lobes being rather pointed. The anal is a little higher than the dorsal, and not quite as long as high; it is scarcely more scaly than the fin opposite.

Colour light greenish, with shining golden bands; a blackish spot superiorly, in the axil of the pectoral fin.

24. **Mugil affinis.**

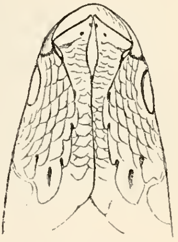
D. $4 \mid \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 38. L. transv. 13.

The height of the body is contained five times and a third in the total length, the length of the head five times. Adipose eyelid well developed anteriorly and posteriorly. The upper lip is rather broad, situated at the lower side of the snout. The extremity of the maxillary is visible behind and below the angle of the mouth. The pectoral does not extend to the origin of the dorsal, and its length equals the distance of the opercular margin from the pupil.

Coast of Amoy (China).

a. Fine specimen. Amoy. Purchased.

Description of the specimen.—This species is allied to *M. parsia*, *strongylocephalus*, and others, from which it may be readily distinguished either by the short pectoral fin or the elongate form of the body. The height of the latter is rather less than one-fifth of the total length. The upper profile is very slightly convex, and forms with the lower the margin of the snout, which is rather sharp. The interorbital space is slightly convex, and its width is contained twice and three-fourths in the length of the head. The snout is as long as the eye, moderately broad, somewhat pointed, with the upper lip situated obliquely at its lower side. The angle made by the front margins of the mandibulary bones is obtuse, and the cleft of the mouth is more than twice as broad as it is deep; the free space at the chin between the mandibles is short, cuneiform. The maxillary is bent downwards behind the angle of the mouth, where its extremity is visible. The præorbital is emarginate, and distinctly denticulated anteriorly and posteriorly. The pectoral is inserted above the middle of the depth of the body, and has a very short and obtuse scale in its axil; it is much shorter than the head, and extends to the eighth scale of the lateral line. The insertion of the ventral falls midway between the base of the pectoral and the vertical from the dorsal. There are twenty-four scales between the snout and the spinous dorsal fin. The latter commences a little nearer to the snout than to the base of the caudal, above the tenth scale of the lateral line; its anterior



M. affinis.

spines are stout, and their length is more than one-half of that of the head. The soft dorsal commences above the twenty-fourth scale, or above the first soft ray of the anal; it is not scaly, higher than long, as high as the spinous dorsal. Caudal emarginate, short, its length being a little more than one-sixth of the total. Anal fin as high as, but rather longer than, the fin opposite. The least depth of the tail is one-half of the length of the head.

Colour greenish, shining silvery.

25. Mugil ophuysenii.

Bleek. Natuurk. Tijdschr. Nederl. Ind. xvi. p. 279, and in *Act. Soc. Sc. Indo-Nederl.* vii., *Sumatra*, viii. p. 82.

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 38–39. L. transv. 12–13.

The height of the body is contained five times and a fourth in the total length, the length of the head five times. The diameter of the eye is contained thrice and two-thirds in the length of the head, and once and a half or once and a third in the width of the interorbital space; eye with a broad adipose membrane. The præorbital is scaly, with a slight notch, and denticulated inferiorly and posteriorly; snout rather sharp, shorter than the eye; the maxillary reaches beyond the præorbital, and its extremity is visible; upper lip thin; a large groove before the vomer. There are nineteen scales between the snout and the first dorsal; a long pointed scale in the axil. The least depth of the tail is a little less than one-half of the length of the head. Dorsal fins nearly equal in height: spines rather slender, the first being scarcely longer than the part of the head behind the eye; it is nearer to the extremity of the snout than to the base of the caudal fin: the soft dorsal is higher than long, scaly below; its origin is above the middle of the anal fin. The anal is scaly, scarcely higher than long, much longer, but only a little higher, than the soft dorsal. Caudal emarginate, two-ninths of the total length. Pectoral nearly as long as the head. Coloration uniform; a small black spot superiorly at the base of the pectoral. (*Bl.*)

Coast of Sumatra.

26. Mugil cunnesius.

Kunnesee, *Russell*, ii. p. 65. pl. 181.

Mugil cunnesius, *Cuv. & Val.* xi. p. 114; *Rüpp. N. W. Fische*, p. 131; *Cant. Catal.* p. 100; (not *Bleek.*).

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 42–43. L. transv. 13.

The height of the body is nearly equal to the length of the head, and one-fifth of the total. The snout is short and obtuse; the interorbital space very slightly convex, its width being two-fifths of the length of the head. Lips thin; the præorbital has the anterior margin nearly straight, neither toothed nor notched; it does not entirely cover the maxillary, the extremity of which is visible behind the angle of the mouth. Eye with an adipose membrane. There are twenty-two scales between the spinous dorsal fin and the snout. The length of the anterior dorsal spines exceeds somewhat one-half of that of the head. The twelfth scale of the lateral line corresponds to the extremity of the pectoral and to the origin of the anterior dorsal, the twenty-fifth to the origin of the posterior, and to the third soft ray of the anal fin; the vertical fins without scales; caudal slightly emarginate. The pectoral is inserted above the middle of the depth of the body, the ventral a little nearer to the root of the pectoral than to the dorsal. The least depth of the tail is less than one-half of the length of the head. Dorsal and caudal fins with indistinct blackish margins; sometimes a black spot superiorly at the base of the pectoral.

Red Sea. East Indian Seas.

a–c. Half-grown and young: skins. Malayan Peninsula. From Dr. Cantor's Collection.—Types of his description.

d. Young. Amboyna. Purchased of Mr. Frank.

27. Mugil speigleri.

Bleek. Natuurk. Tijdschr. Nederl. Ind. xvi. p. 279, and *Act. Soc. Sc. Indo-Nederl.* vi., *Borneo,* xiii. p. 58.

$$\mathrm{D.}\ 4 \Big| \frac{1}{9}.\quad \mathrm{A.}\ \frac{3}{9}.\quad \mathrm{L.\ lat.}\ 40\text{–}42.$$

The height of the body is nearly equal to the length of the head, and one-fifth of the total; the diameter of the eye is contained thrice and two-fifths in the length of the head, and once and two-fifths in the width of the interorbital space. Eye with a broad adipose membrane anteriorly and posteriorly; præorbital scaly, scarcely emarginate or denticulated; snout obtuse, convex, shorter than the eye; the maxillary extends beyond the præorbital and is visible; upper lip rather thin; a shallow groove before the vomer. There are about twenty scales between the snout and the spinous dorsal fin; an elongate scale in the axil. The least depth of the tail is one-half of the length of the head. The dorsal fins are nearly equal in height; the spines are rather slender, the first being longer than the part of the head behind the orbit, and situated much nearer to the end of the snout than to the base of the caudal. The soft dorsal is nearly entirely scaly, and scarcely higher than long. The anal fin is scaly, scarcely higher, but longer, than the soft dorsal fin; its anterior third is situated before the origin of the soft dorsal. Caudal fin slightly emarginate, its length being contained four times and two-thirds in the total. Pectoral as long as, or longer than, the head. Coloration uniform; dorsal and caudal fins minutely dotted with brown; a blackish spot superiorly at the base of the pectoral. (*Bl.*)

Coasts of Java, Borneo, and Halmaheira.

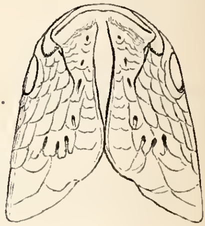
28. Mugil waigiensis.

Mugil waigiensis, *Quoy & Gaim. Voy. Freyc. Poiss.* p. 337. pl. 59. fig. 2; *Bleek. Natuurk. Tijdschr. Nederl. Ind.* xvi. p. 276; *Atl. Mugil.* tab. 2. fig. 2; *Act. Soc. Sc. Indo-Nederl.* vii., *Borneo,* xiii. p. 43.

Mugil macrolepidotus, *Rüpp. Atl. Fische*, p. 140. taf. 35. fig. 2; *Cuv. & Val.* xi. p. 134; *Cant. Catal.* p. 95; (not *Rich.*).
—— melanochir, (*Kuhl & v. Hass.*) *Cuv. & Val.* xi. p. 143 (young); *Bleek. Borneo*, vi. p. 423.

D. 4 | $\frac{1}{7}$. A. $\frac{3}{8}$. L. lat. 26–27. L. transv. 9. Cæc. pylor. 10. Vert. 11/13.

The height of the body is contained four times and a fourth to four times and three-fourths in the total length, the length of the head four times and a half. Head broad, flat above, the width of the interorbital space being one-half of the length of the head. Snout short, broad, depressed, obtuse. Lips thin; the angle made by the anterior margins of the mandibulary bones is very obtuse. The free space at the chin, between the mandibles, is broadly lanceolate. The inferior extremity of the maxillary is visible below the angle of the mouth. Eye without adipose membrane. There are sixteen series of scales between the spinous dorsal fin and the snout. The pectoral extends to the vertical from the origin of the dorsal. The eighth and seventeenth scales of the lateral line correspond to the origins of the two dorsal fins. The soft dorsal and the anal short and elevated, scaly; caudal very slightly emarginate. Pectorals blackish, entirely black in immature specimens.



M. waigiensis.

From the Red Sea through the Indian Ocean and Archipelago to the coasts of Australia and to Polynesia.

a. Adult: stuffed. Red Sea. From Dr. Rüppell's Collection.
b–f. Half-grown and young. Red Sea. Presented by Dr. Rüppell.
g. Young: skin. Sea of Pinang. From Dr. Cantor's Collection.
h. Young. East Indian Archipelago. Purchased of Mr. Frank.
i. Young. North-western Australia. Presented by Sir J. Richardson.
k. Half-grown. South Australia. From Mr. Dring's Collection.
l. Adult: skeleton.

Mugil rossii (Bleek. Kokos, p. 45), known from a single specimen, and described as having a more slender body than *M. waigiensis*, its height being nearly one-sixth of the total length, is, perhaps, not specifically different from the above species.

Skeleton.—This species differs from *M. septentrionalis* and *M. brasiliensis* in the form of its skull, which is much broader, flatter, and smoother. Each principal frontal bone is not much longer than broad. The turbinal bones are very broad, subquadrangular, close together, and forming a long suture with the frontals. Part of the ethmoid ossified. The crests in the occipital region are feeble. The abdominal and caudal portions of the vertebral column are equal in length.

29. Mugil suppositus.

Mugil borbonicus, *Cant. Catal.* p. 101; (not *Cuv. & Val.*, not *Bleek.*).

D. $4 \mid \frac{1}{8}$. A. $\frac{1}{8}$. L. lat. 40. L. transv. 14.

The height of the body is contained four times and a half in the total length, the length of the head five times; the head is rather short and high, the width of the interorbital space being two-fifths of its length. The snout short and convex; the cleft of the mouth is transverse, the anterior margins of the mandibulary bones forming a very obtuse angle. The inferior extremity of the maxillary projects a little beyond the præorbital, behind the angle of the mouth; the space at the chin between the mandibulary bones appears to be narrow. Lips thin; eye without adipose membrane. There are twenty-one scales between the spinous dorsal fin and the snout. The length of the anterior dorsal spines is one-half of that of the head; the pectoral is shorter than the head, and inserted above the middle of the depth of the body, the ventral midway between the root of the pectoral and anterior dorsal. The tenth, the twelfth and the twenty-fourth scales of the lateral line correspond to the extremity of the pectoral and to the origin of the two dorsal fins: the anal commences a little in advance of the opposite dorsal fin; both are scaly: caudal emarginate. The least depth of the tail is equal to, or rather less than, one-half of the length of the head. Dorsal fins with a narrow anterior, caudal with a broad posterior black margin. A black spot superiorly at the base of the pectoral.

Pinang River.

a. Stuffed. Type of the species. From Dr. Cantor's Collection.

The circumstance of having Cantor's typical specimen has induced me to give a full description of it, by which it will be evident that it is specifically different from *M. borbonicus* of Valenciennes as well as of Bleeker, having a naked eye without adipose membrane, and eight anal rays. Cantor states nine anal rays; but he has taken the last, which is split to its base, for two.

30. Mugil octo-radiatus.

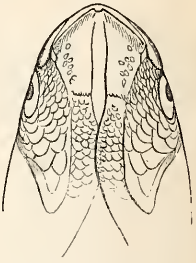
D. $4 \mid \frac{1}{8}$. A. $\frac{3}{8}$. L. lat. 42. L. transv. 14.

The height of the body is contained five times and a third in the total length. The outermost extremity of the maxillary is visible behind the angle of the mouth. The free space at the chin, between the mandibles, is narrow, elongate, extending to between the interopercula. The pectoral does not reach to the vertical from the origin of the dorsal fin.

English coasts.

a. Thirteen inches long. England. Presented by Mr. Gerrard.
b. Thirteen inches long: skin. London market. From Mr. Yarrell's Collection as *Mugil capito*.

Description.—The height of the body is contained five times and a third in the total length, the length of the head five times and a fifth. The head is moderately high and broad, and has the snout somewhat produced, as in *M. auratus*. The interorbital space is convex, its width being contained twice and a third in the length of the head. The upper lip is membranaceous, not thick, visible from above. The angle made by the anterior margins of the mandibles is somewhat more than a right one, and the cleft of the mouth is nearly half as deep as it is broad. The outermost extremity of the maxillary is visible between the angle of the mouth and the anterior angle of the præorbital; the latter is obliquely truncated, so that its front angle is very obtuse, whilst the posterior one is acute; its lower margin is denticulated. The free space at the chin, between the mandibles, is narrow, elongate, extending on to between the interopercles. The nostrils are close together, situated midway between the end of the snout and the orbit. Adipose eyelid none. There are twenty-five scales between the snout and the spinous dorsal fin; the latter commences a little nearer to the snout than to the base of the caudal, vertically above the fourteenth scale of the lateral line; its two anterior dorsal spines are of nearly equal length, and one-half of that of the head; pointed scales extend along the whole length of its base. The soft dorsal fin is nearly as high as the former, and commences above the twenty-eighth scale of the lateral line, or above the second soft ray of the anal. The caudal is deeply forked, the length of a lobe being equal to that of the head. Anal fin as high as the spinous dorsal. The pectoral is inserted somewhat above the middle of the depth of the body, and extends to the twelfth scale of the lateral line, its length being equal to the distance of the posterior nostril from the end of the operculum; there is no pointed scale in its axil. The ventral is inserted midway between pectoral and dorsal fin.



M. octo-radiatus.

Back greenish; sides and belly silvery, with darker stripes along the series of scales.

This species cannot be the *M. curtus* of Yarrell, which is said to be distinguished by its very short body, and which, perhaps, has nine anal rays. It is most closely allied to *M. auratus*, which, however, always has nine anal rays, and differs in several other points, chiefly in the configuration of the lower jaw. The anal fin of our specimen is quite perfect, showing the last ray divided nearly to its base, both portions being joined to the same interhæmal spine. There can be no doubt that this is a very distinct species, from the British coast, although apparently scarce.

Since the first description of this species (in Ann. & Mag. Nat. Hist. 1861, May), I have found a second specimen, which agrees with the first in every point. It is from Yarrell's collection, who took it for *Mugil capito*.

31. Mugil curtus.

Yarr. Brit. Fishes, i. p. 210, 2nd edit. i. p. 245, 3rd edit. ii. p. 186; *Cuv. & Val.* xi. p. 70. pl. 311.

We have not been able to find the typical specimen in the collection left by Yarrell; it is said to have been *two inches long,* and to have been caught in Poole Harbour *with the young of the common Grey Mullet.* The depth of its body was equal to the length of the head and one-fourth of the total, and the soft anal rays were eight in number.

Valenciennes believed that he recognized a species thus characterized in another single specimen eight inches in length caught in the Baie de la Somme. But it is very suspicious that he does not give a full description of it, as he has of the other European species. He merely confirms Yarrell's statement of the proportions of the body; and although he gives also the same number of anal rays in the formula of the fins, the figure shows nine. It is, therefore, impossible to form a correct idea as to the validity of the characters of this species.

32. Mugil capito.

The Grey Mullet. Cefalo calamita (Rome); Caustello (Venice); Bouri (Egypt).

Mugil, *Artedi, Genera,* p. 32, *Species,* p. 71; *Gronov. Zoophyl.* no. 397.

Meuille blanc, *Duham. Pêches,* ii. sect. 6. p. 147. pl. 11. fig. 3.

Mugil capito, *Cuv. Règne Anim.*; *Bonap. Faun. Ital. Pesc.*; *Cuv. & Val.* xi. p. 36. pl. 308; *Jen. Vert. An.* p. 374; *Parn. Wern. Mem.* vii. p. 225. t. 28, cop. from *Cuv. & Val.*, and *Fishes Frith of Forth,* p. 65, cop. from *Jenyns*; *Yarr. Brit. Fishes,* i. p. 200, 2nd edit. i. p. 234, 3rd edit. ii. p. 175; *Nilss. Skand. Faun.* iv. p. 176; *Guichen. Explor. Algér. Poiss.* p. 67.

—— cephalus, var. A, *Risso, Ichth. Nice,* p. 344.

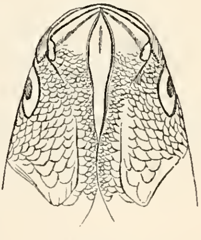
—— ramada, *Risso, Eur. Mérid.* iii. p. 390.

—— cephalus, *Donov. Brit. Fishes,* i. pl. 15; *Neill, Wern. Mem.* i. p. 544; *Turton, Brit. Faun.* p. 106; *Flem. Brit. An.* p. 217; *Gronov. Syst. ed. Gray,* p. 162.

—— britannicus, *Hancock, Lond. Quart. Journ. Sc.* 1830, p. 129.

D. 4 | $\frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 45. L. transv. 14. Cæc. pylor. 6–7. Vert. 12/12.

The height of the body is contained five times or five times and one-third in the total length, the length of the head four times and a half. The snout is broad and depressed; the interorbital space slightly convex, its width being contained twice and a half or twice and two-thirds in the length of the head. The angle made by the two mandibulary bones is rather obtuse; the præorbital has an obtuse longitudinal ridge, and does not entirely cover the maxillary bone. Eyes without adipose membrane: nostrils close together; they are less distant from each other than the posterior is from the eye. The lips are not covered by



M. capito.

the nasal bones. The space at the chin, between the mandibularies and the interopercula, is rather broad, elongate, cuneiform. There are twenty-eight or thirty scales between the snout and the spinous dorsal. The two anterior dorsal spines are nearly half as long as the head. The eighth or ninth, the twelfth or thirteenth, and the twenty-fourth or twenty-fifth scales of the lateral line correspond to the extremity of the pectoral and to the origin of the two dorsal fins. The root of the pectoral is above the middle of the body; the ventral is inserted midway between the pectoral and spinous dorsal. Dark stripes along the series of scales; generally a blackish spot superiorly at the base of the pectoral.

Coasts of Europe. Nile. Freshwater lakes of Tunis. Cape of Good Hope.

a. Young: stuffed. Frith of Forth. From Dr. Parnell's Collection.
b–c. Fine specimens. British coast.
d–f. Adult and half-grown: stuffed. English coast.
g, h–l. Half-grown and young: not good state. English coast. Presented by Mr. Yarrell as *M. cephalus*.
m. Young. Devonshire. Museum Leach.
n, o. Adult. Lisbon. Presented by the Rev. R. T. Lowe.
p. Adult. Dalmatia.
q. Young. Mediterranean. Presented by Dr. Rüppell.
r–u, v–z. Adult and half-grown. Nile (Cairo). Collected by Mr. Petherick, H.M. Consul at Chartum.
α. Half-grown. Cape of Good Hope. Presented by the Medical Officers R.A.
β. Young: skin. From Gronow's Collection.
γ. Adult: skeleton. England. Purchased.

Valenciennes, relying upon the authority of Ehrenberg and upon the specimens collected by him, states that, besides the true *M. capito*, another species is found in the Nile closely resembling it, but distinguished by the position of the dorsal fins. "The distance between the commencement of the first dorsal and that of the second is less than in the other species [of Europe], for in the latter it is equal to the distance between the commencement of the second dorsal and that of the caudal, whilst in the *Dubahra* it is one-fourth less. Otherwise the species agrees with *M. capito*." He calls this species *M. dubahra* (xi. p. 60). Having examined our European and African specimens of *M. capito* with regard to the position of their dorsal fins, I found that they are intermediate between *M. capito* and *M. dubahra*. The future must show whether the *Dubahra* has other characters by which it may be distinguished from *M. capito*.

The *skeleton* does not differ from that of *M. septentrionalis*.

33. Mugil richardsonii.

Smith, Illustr. Zool. South Afr. Pisc. pl. 29. fig. 1.

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 46. L. transv. 16.

The height of the body is contained four times and a half in the total length, the length of the head four times and two-thirds. The snout is moderately broad, the width of the interorbital space being nearly one-third of the length of the head. Eye without adipose membrane. The nostrils are close together, much nearer to each other than to the orbit. Lips not thick; the præorbital does not entirely cover the maxillary. There are thirty scales between the anterior dorsal fin and the snout. The two anterior dorsal spines are one-half the length of the head. The sixteenth scale of the lateral line corresponds to the origin of the anterior dorsal fin.

Cape Seas.

a. Adult: stuffed. Cape Seas. Type of the species. Presented by Sir A. Smith.

b–d. Half-grown: skins. Cape Seas.

34. **Mugil petherici.**

D. $4 \mid \frac{1}{9}$. A. $\frac{3}{10}$. L. lat. 45. L. transv. 14.

Adipose eyelid not developed; upper lip rather thin. Extremity of the maxillary visible; a pointed scale in the axil of the pectoral; caudal fin deeply forked.

Nile, at Cairo.

a. Ten and a half inches long. Collected by Mr. Petherick, H.M. Consul at Chartum.

Description of the specimen.—This species is similar to *M. capito* or *M. dubahra*, Cuv. & Val., from which, however, it may be readily distinguished by the number of the fin-rays and by several other minor characters. The height of the body is contained five times and a third in the total length, the length of the head five times. The snout is broad and depressed, much longer than the eye; the interorbital space slightly convex, its width being two-fifths of the length of the head. The upper lip has a series of minute cilia. The angle at the symphysis of the mandibles is obtuse, and the cleft of the mouth is twice and a half as broad as it is deep. The præorbital has no longitudinal ridge, a shallow anterior notch, the extremity rounded, and the margins serrated. Eyes with the adipose membrane rudimentary, just touching the iris. Nostrils close together; they are less distant from each other than the posterior is from the eye. The space at the chin, between the mandibles and the interopercula, is rather broad, elongate, cuneiform. There are thirty scales between the snout and the spinous dorsal. The length of the anterior dorsal spine is somewhat more than one-half of the length of the head. The origin of the spinous dorsal is halfway between the snout and the root of the caudal. The twelfth, the fifteenth, and the twenty-seventh scales of the lateral line correspond to the extremity of the pectoral and to the origins of the two dorsal fins. The soft dorsal and anal are scaly at the base, and the former commences in the vertical from the fourth soft ray of the anal fin. The caudal fin is deeply forked, the length of one of its lobes being somewhat less than one-fifth of the total. The root of the pectoral is on the middle of the depth of the body; its length equals the distance of its base from the eye; it has a pointed scale in its axil, but it is not very long. The least depth of the tail is less than one-half the length of the head.

Silvery, shining golden, with darker stripes along the series of the scales; a blackish spot superiorly at the base of the pectoral.

35. Mugil auratus.

Daurin (Nice); Lotregano (Venice).

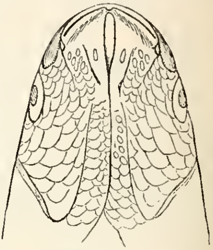
Mugil auratus, *Risso, Ichth. Nice*, p. 344, and *Eur. Mérid.* iii. p. 390; *Cuv. Règne Anim.*; *Bonap. Faun. Ital. Pesc.*; *Cuv. & Val.* xi. p. 43. pl. 308; *Lowe, Proc. Zool. Soc.* 1843, p. 86; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 395; *Guichen. Explor. Algér. Poiss.* p. 67; *Cuv. Règne Anim. Ill. Poiss.* pl. 76. fig. 1; *Lowe, Fish. Mad.* p. 163.

—— chelo, *Lowe, Trans. Zool. Soc.* ii. p. 184; (not *auct.*).

—— madeirensis, *Lowe, Proc. Zool. Soc.* 1839, p. 82, & 1843, p. 86, and *Trans. Zool. Soc.* iii. p. 8.

D. 4 | 9. A. $\frac{3}{9}$. L. lat. 42–45. L. transv. 14. Cæc. pylor. 8. Vert. 11/13.

The height of the body is contained five times and one-fourth to five times and three-fourths in the total length, the length of the head five times. The snout is broad and depressed; the interorbital space slightly convex, its width being two-fifths of the length of the head. The upper lip does not show anything particular, and is not covered by the nasal bones. The angle made by the two mandibularies is rather obtuse, and the cleft of the mouth is more than twice as broad as it is deep; the præorbital has a longitudinal ridge covered with skin, and only the outermost extremity of the maxillary bone projects beyond its margin. Eyes with a rudimentary adipose membrane: nostrils close together; they are less distant from each other than the posterior is from the eye. A short lanceolate portion of the chin is not covered by the mandibularies. There are twenty-five scales between the snout and the spinous dorsal. The two anterior dorsal spines are nearly one-half of the length of the head. No pointed scale in the axil of the pectoral. The thirteenth, the fourteenth, and the twenty-sixth scales of the lateral line correspond to the extremity of the pectoral and to the origin of the two dorsal fins. The root of the pectoral is above the middle of the body; the ventral is inserted midway between the pectoral and spinous dorsal. Dark stripes along the series of scales.



M. auratus.

Mediterranean. Canary Islands. British coast.

a. Twelve inches long. Lanzarote. Presented by the Rev. R. T. Lowe.

b–c. Fine specimens. England.

36. Mugil saliens.

Filzetta (Tuscany); Cefalo musino (Rome); Flaveton (Nice); Verzellata (Venice); Bouri (Nile).

Mugil saliens, *Risso, Ichth. Nice*, p. 345, and *Eur. Mérid.* iii. p. 391; *Cuv. & Val.* xi. p. 47. pl. 309; *Bonap. Faun. Ital. Pesc.*; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 395; *Guichen. Explor. Algér. Poiss.* p. 67.

Bouri, *Sonnini, Voy. Eg.* ii. p. 296. pl. 23. fig. 2.

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 45. L. transv. 15. Cæc. pylor. 8.

The height of the body equals the length of the head, and is contained five times and a half in the total. The snout is moderately broad, somewhat tapering anteriorly; the width of the interorbital space is one-third of the length of the head. The angle made by the two mandibulary bones is a right one; the præorbital does not entirely cover the maxillary. Eyes without adipose membrane; nostrils close together, the posterior being in the middle between the anterior and the orbit. Lips not very thick, not covered by the nasal bones. The space at the chin, between the mandibularies and the interopercula, is elongate, tapering anteriorly. The two anterior dorsal spines are half as long as the head; the pectoral terminates at some distance from the vertical from the origin of the dorsal, and its root is somewhat above the middle of the body. Dark shining streaks along the series of scales.

Mediterranean. Nile.

a. Half-grown. From the Collection of the Zoological Society.

Valenciennes mentions another fish, from the Cape of Good Hope, very similar to *M. saliens*, and calls it *Mugil capensis* (xi. p. 108). Smith has recognized and figured this fish in Illustr. Zool. South Africa, Pisc. pl. 30. fig. 1. Both naturalists, however, have given so scanty a description, that it is impossible to point out the characteristic differences between *M. saliens* and *capensis*. There is a stuffed specimen of the latter in the British Museum, but (as is frequently the case with stuffed fishes of this genus) the form of the head is so greatly altered that no description can be taken from it.

a. Adult: stuffed. Cape. From Sir A. Smith's Collection.

b. Half-grown: very bad state. Cape. From the Haslar Collection.

Mugil euronotus, Smith, Ill. Zool. South Afr. pl. 29. fig. 2, is entirely identical with *M. capensis*.

c. Adult: stuffed. Cape. From Sir A. Smith's Collection.—Type of *M. euronotus*.

37. Mugil multilineatus.

Smith, Illustr. Zool. South Afr. Pisc. pl. 30. fig. 2.

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 46. L. transv. 15.

The height of the body equals the length of the head, and is contained four times and three-quarters in the total. The snout is rather produced, obtusely pointed, its length being nearly equal to the width of the interorbital space, which is contained twice and three-fourths in the length of the head. The cleft of the mouth is subsemicircular; the præorbital has an obtuse longitudinal ridge, and does not entirely cover the maxillary bone. Eyes without adipose membrane; nostrils close together, somewhat nearer to the orbit than to the extremity of the snout. Lips not thick, not covered by the nasal bones. There is a lanceolate space at the chin which is not covered by the mandibulary bones. Twenty-seven or twenty-eight scales between the spinous dorsal and the end of the snout. The two anterior dorsal spines are half as long as the head. The fifteenth and the twenty-ninth scales of the lateral line correspond to the origins of the two dorsal fins. The root of the pectoral fin is on the middle of the body. Dark lines along the series of scales.

Coasts and rivers of the Cape.

a. Type of the species: stuffed. From Sir A. Smith's Collection.

38. Mugil cryptochilus.

Cuv. & Val. xi. p. 61.

D. $4 \left| \frac{1}{8} \right.$. A. $\frac{3}{9}$. L. lat. 45.

The nasal bones are advanced, so as to cover the upper lip when the mouth is closed. The præorbital does not entirely cover the maxillary. The length of the head is one-fifth of the total, or thrice the diameter of the eye. Eye without adipose membrane. Pectoral long, falciform, with the lanceolate scale in the axil short; scale at the base of the spinous dorsal long, extending beyond the posterior spine. Caudal deeply forked, with the upper lobe longest. (*Val.*)

The single specimen observed is eight inches long.

Nile.

39. Mugil axillaris.

? Mugil axillaris, *Cuv. & Val.* xi. p. 131.
Mugil axillaris, *Bleek. Natuurk. Tijdschr. Nederl. Ind.* iv. 1853, p. 266, and *Act. Soc. Sc. Indo-Nederl.* viii., *Sumatra*, ix. p. 3.
—— parsia, *Bleek. Natuurk. Tijdschr. Nederl. Ind.* iii. 1852, p. 166.

D. $4 \left| \frac{1}{8} \right.$. A. $\frac{3}{9}$. L. lat. 42–43. L. transv. 13–14.

The height of the body is contained four times and a half to five times and a half in the total length, the length of the head four times and a half to six times and a fifth; the diameter of the eye is one-third or one-fourth, the width of the interorbital space one-half of the length of the head. Adipose eyelid not developed; the præorbital is scarcely emarginate and indistinctly denticulated; snout shorter than the orbit; upper lip rather fleshy; maxillary hidden. There are twenty-one scales between the snout and the origin of the spinous dorsal; an elongate scale in the axil. Dorsal fins nearly equal in height: the spines are rather slender, and the length of the first equals the length of the head behind the orbit; it stands on the middle between the end of the snout and the base of the caudal fin. The soft dorsal fin is nearly entirely scaly: anal scaly, higher and longer than the soft dorsal; it commences scarcely before the dorsal: caudal emarginate, its length being rather less than one-fourth of the total. Pectoral nearly as long as the head. Coloration uniform; axil with a blackish spot. (*Bl.*)

East Indian Archipelago. (? New Guinea, Mauritius.)

40. Mugil cæruleo-maculatus.

? Mugil cæruleo-maculatus, *Lacép.* v. pp. 385, 389; *Cuv. & Val.* xi. p. 128.

Mugil cæruleo-maculatus, *Bleek. Riouw*, p. 484, and *Act. Soc. Sc. Indo-Nederl.* viii., *Sumatra*, ix. p. 5.

$\text{D. } 4 \mid \frac{1}{8}. \quad \text{A. } \frac{3}{9}. \quad \text{L. lat. } 38. \quad \text{L. transv. } 12.$

The height of the body is contained four times and a quarter to four times and two-thirds in the total length, the length of the head five times to five times and two-thirds. Snout not depressed, convex; the upper lip is thick, without fleshy fringes. The præorbital is not emarginate, scarcely denticulated, and covers entirely the maxillary. Eye without adipose membrane. The pectoral is longer than the head; the length of the anterior dorsal spines is less than one-half of that of the head. The second dorsal and the anal are scaly, and commence nearly in the same vertical; caudal forked. A blackish spot superiorly at the base of the pectoral.

Coasts of Mauritius. East Indian Archipelago.

41. Mugil bleekeri.

Mugil borbonicus, *Bleek. Natuurk. Tijdschr. Nederl. Ind.* xviii. 1859, p. 375 (not *Cant.*, not *Cuv. & Val.*).

$\text{D. } 4 \mid \frac{1}{8}. \quad \text{A. } \frac{3}{9}. \quad \text{L. lat. } 38\text{–}39. \quad \text{L. transv. } 13\text{–}14.$

The height of the body is contained four times and two-fifths in the total length, the length of the head four times and three-fourths or five times. Snout somewhat pointed, shorter than the eye; the width of the interorbital space is contained twice and one-third in the length of the head. Lips thin: the præorbital is slightly emarginate anteriorly, with the denticulation more distinct posteriorly than inferiorly; it covers the maxillary, except its hindmost extremity. Eye without developed adipose membrane. There are about twenty scales between the spinous dorsal and the snout. The length of the anterior dorsal spines is one-half of that of the head: the pectoral is nearly as long as the head: the anal commences in, or scarcely before, the vertical from the origin of the opposite dorsal fin; both are scaly: caudal emarginate. The least depth of the tail is somewhat more than one-half the length of the head. A black spot superiorly at the base of the pectoral. (*Bl.*)

Rivers of Banka.

This species differs from *M. borbonicus*, Cuv. & Val., in not having a developed adipose eyelid, and from *M. borbonicus*, Cant., or *M. suppositus*, m., in the number of the anal rays; it appears to be very nearly allied to *M. axillaris*, Bleek.

42. Mugil ceylonensis.

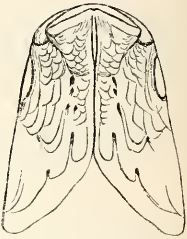
D. $4 \mid \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 32. L. transv. 12.

Eyes without adipose membrane. Upper lip thin, truncated, forming the front margin of the snout; the mandibles nearly entirely cover the chin, without leaving a distinct free space between them. Maxillary entirely hidden. The pectoral extends beyond the origin of the spinous dorsal fin, and is nearly as long as the head. Vertical fins scaly.

Ceylon.

a. Five inches long. Ceylon. From the Collection of Messrs. von Schlagintweit.
b–d. Young. Ceylon. From the Collection of Messrs. von Schlagintweit.

Description.—The height of the body equals the length of the head, and is contained four times and two-thirds in the total length, the length of the caudal fin four times and a fifth; the least depth of the tail is one-half the length of the head. The upper profile descends in a curve from the dorsal fin to the snout. The interorbital space is slightly convex, and its width is a little less than one-half of the length of the head. Snout obtuse, truncated, broad, rather shorter than the eye; its front margin is formed by the upper lip, which is thin and truncated. The anterior margins of the lower lips form an obtuse angle, and the cleft of the mouth is thrice as broad as it is deep. The mandibles nearly entirely cover the chin, leaving scarcely any free space between them. The maxillary is entirely hidden. The præorbital has a slight notch anteriorly, and its extremity rounded and toothed. The nostrils are close together, and the posterior is nearly in the middle between anterior and orbit. No adipose eyelid. The pectoral is inserted above the middle of the depth of the body, and has a short pointed scale in its axil; it is nearly as long as the head, and extends to the ninth scale of the lateral line, or somewhat beyond the vertical from the dorsal fin. The ventral is inserted midway between base of the pectoral and spinous dorsal. The latter commences above the eighth scale, and somewhat nearer to the base of the caudal than to the snout; the length of its anterior spine is more than half the length of the head. The soft dorsal commences above the nineteenth scale, or above the first soft anal ray; it is scaly, twice as high as long, much higher than



M. ceylonensis.

the spinous dorsal, and nearly as high as the tail underneath. Caudal long, forked. The anal is scaly, as high as, and longer than, the fin opposite.

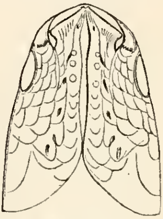
Greenish, shining silvery; a blackish spot superiorly in the axil of the pectoral.

43. Mugil smithii.

Mugil macrolepis, *Smith, Ill. Zool. S. Afr. Pisc.* pl. 28. fig. 2 (not *Rüpp.* or *Bleek.*).

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 33–34. L. transv. 11–12.

The height of the body equals the length of the head, and is contained four times and two-thirds in the total. The least depth of the tail is not quite one-half of the length of the head. Eye with a very narrow adipose membrane posteriorly. The profile between the spinous dorsal and the snout is nearly straight, obliquely descending; the interorbital space flattened, its width being contained twice and a third in the length of the head. Snout broad, obtuse, depressed, with the upper lip rather thin; the angle made by the anterior margins of the mandibulary bones is rather obtuse; the cleft of the mouth is more than twice as broad as it is deep. The mandibles leave an elongate lanceolate space between them. The extremity of the maxillary is conspicuous behind the angle of the mouth; the præorbital has a slight notch anteriorly, and the extremity truncated and denticulated. Nostrils close together, the posterior being nearer to the anterior than to the orbit. There are twenty scales between the spinous dorsal and the snout. The pectoral is inserted somewhat above the middle of the depth of the body, and has a very short, pointed scale in its axil; it is shorter than the head, the length of the snout not included, and extends to the ninth scale of the lateral line. The eleventh and the twenty-third scales of the lateral line correspond to the origin of the dorsal fins. The posterior dorsal and the anal are scaly, and the anterior third of the latter falls before the origin of the former; caudal emarginate. The first dorsal spine stands exactly in the middle between the snout and the base of the caudal fin.



M. smithii.

Rivers and freshwater lakes of the Cape.

a. Adult: stuffed. From Sir A. Smith's Collection.—Type of the species.

b. Half-grown. Presented by Sir A. Smith.

Our description has not been taken from the typical specimen, which has suffered considerably from stuffing. We would take this opportunity of observing, that all the figures of *Mugil* in the work above quoted have been executed from stuffed specimens, by which their scientific value is much lessened; and that, in the descriptions, very little notice has been taken of those characters by which alone the different species can be distinguished.

44. Mugil troschelii.

Bleeker, Natuurk. Tijdschr. Nederl. Ind. xvi. p. 277, and *Act. Soc. Sc. Indo-Nederl.* vi., *Sumatra,* viii. p. 80.

D. $4 \,\big|\, \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 31–32. L. transv. 10–11.

The height of the body equals the length of the head, and is one-fifth of the total; the head is three-fourths as high as long; the diameter of the eye is contained thrice and a third in the length of the head, and is two-thirds of the width of the interorbital space. Eyelids not developed. The upper profile of the head and nape is convex. Præorbital scaly, slightly emarginate and indistinctly denticulated; snout shorter than the eye; the maxillary extends beyond the præorbital, and its extremity is uncovered; upper lip thin; no groove before the vomer. There are eighteen or nineteen scales between the snout and the dorsal fin; the scale in the axil is short. The least depth of the tail is one-half of the length of the head. The spinous dorsal fin is higher than the soft; the spines are strong, the first being the longest and strongest, longer than the part of the head behind the orbit; it is nearer to the base of the caudal than to the end of the snout. The soft dorsal fin is entirely scaly, twice as high as long: the anal fin is entirely scaly, a little higher and much longer than the soft dorsal; its anterior third is before the origin of the soft dorsal: caudal fin emarginate, its length being contained four times and three-fifths in the total. Pectoral shorter than the head. Coloration uniform.

Coasts of Java, Sumatra, Borneo, and Ceylon.

a. Half-grown. Purchased of Mr. Frank.
b. Half-grown. Point de Galle. Presented by Sir A. Smith.
c. Adult. Ceylon. Presented by the Medical Officers R.A.

45. Mugil borneensis.

Mugil borneensis, *Bleeker, Natuurk. Tijdschr. Nederl. Ind.* ii. 1851, p. 201, and *Act. Soc. Sc. Indo-Nederl.* vi., *Borneo,* xiii. p. 55.
—— adustus, *Bleek. Natuurk. Tijdschr. Nederl. Ind.* v. 1853, p. 503.

D. $4 \,\big|\, \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 34–35. L. transv. 10–11.

The height of the body is contained four times and a third to four times and three-fourths in the total length, the length of the head five times to five times and two-fifths; the diameter of the eye is contained four times in the length of the head, and once and three-quarters in the interorbital space. Adipose eyelid not developed; præorbital slightly emarginate anteriorly, truncated and denticulated posteriorly. The snout is nearly as long as the eye, somewhat shorter in immature specimens; the extremity only of the maxillary is visible;

upper lip thin; no groove before the vomer. There are twenty-one or twenty-two scales between the snout and the first dorsal fin; a short pointed scale in the axil. The least depth of the tail is one-half, or rather more than one-half, of the length of the head. The dorsal fins are nearly equal in height; the spines are strong: the first is the strongest, and longer than the part of the head behind the orbit; it is much nearer to the base of the caudal fin than to the extremity of the snout. The soft dorsal fin is nearly entirely scaly, much higher than long: the anal fin is scaly, and nearly wholly situated before the soft dorsal; it is scarcely higher, but much longer, than the soft dorsal: caudal fin emarginate, one-fifth of the total length. Pectoral much longer than the part of the head behind the orbit. Coloration uniform, fins blackish towards the margin; anal generally with a whitish margin. (*Bl.*)

East Indian Archipelago.

46. Mugil ceramensis.

Bleeker, Ceram, ii. p. 699, and *Act. Soc. Sc. Indo-Nederl.* vi., *Borneo,* xiii. p. 48.

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 29–30. L. transv. 9–10.

The height of the body is contained four times and a fourth to four times and a half in the total length, the length of the head four times and two-thirds. The greatest depth of the head is two-thirds of its length. Eyes without adipose membrane. Snout much shorter than the eye; præorbital slightly notched anteriorly; maxillary entirely hidden; upper lip thin. Pectorals shorter than the head; the second dorsal and anal scaly, the latter being situated nearly entirely before the former; caudal emarginate. (*Bl.*)

East Indian Archipelago.

47. Mugil oligolepis.

? Mugil amarulus, *Cuv. & Val.* xi. p. 133.
Mugil dussumieri, *Bleek. Contr. Ichth. Sumb. in Journ. Ind. Archip.* ii. p. 637; (not *Natuurk. Tijdschr. Nederl. Ind.* xiii. p. 339; not *Cuv. & Val.*).
—— macrolepis, *Bleek. Borneo,* vi. p. 422; (not *Rüpp.* or *Smith*).
—— oligolepis, *Bleek. Natuurk. Tijdschr. Nederl. Ind.* 1858, xvi. p. 275, and *Act. Soc. Sc. Indo-Nederl.* vi., *Borneo,* xiii. p. 40.

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 26. L. transv. 10–11.

The height of the body is one-fourth, the length of the head one-fifth of the total length; the head is not much longer than high. Eye not covered by an adipose membrane. Snout depressed, not convex, shorter than the eye; the maxillary is hidden when the mouth is closed; the upper lip rather thick; præorbital moderately emarginate, denticulated. Pectorals nearly as long as the head; caudal slightly emarginate. (*Bl.*)

Coast and rivers of Borneo and Sumbawa.

48. Mugil hypselopterus.

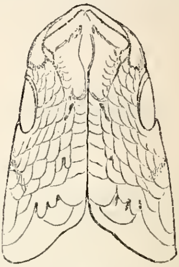
D. $4 \,\Big|\, \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 23–26. L. transv. 8.

The height of the body equals the length of the head, and is one-fifth of the total; head much longer than high. Eye without adipose membrane. The extremity of the maxillary is conspicuous behind and below the angle of the mouth. Fins rather elongate; the second dorsal is as high as the body below.

Niger.

a. Six inches long. River Niger. From Mr. Fraser's Collection.

Description of the specimen.—The body is subcylindrical anteriorly, compressed posteriorly; its greatest depth, below the anterior dorsal, equals the length of the head, and is one-fifth of the total. The head is rather elongate, its height being two-thirds of its length. The interorbital space is somewhat convex, its width being two-fifths of the length of the head. The snout is of moderate breadth, somewhat pointed, and rather longer than the eye. The angle made by the front margins of the mandibulary bones is nearly a right one, the cleft of the mouth being rather more than twice as broad as it is deep. The free space at the chin, between the two mandibles, is short, lanceolate. The maxillary is bent downwards below and behind the angle of the mouth, where its extremity is visible; the præorbital is angularly bent, and has a rounded, denticulated extremity. The upper lip is moderately broad. The nostrils are close together, and the posterior is nearer to the anterior than to the orbit. The pectoral fin is inserted above the middle of the depth of the body, and has no elongate pointed scale in its axil; it extends to the seventh scale of the lateral line, and its length equals the distance of the opercular margin from the nostril. The base of the ventral is somewhat nearer to that of the pectoral than to the vertical from the dorsal. There are seventeen scales between the snout and the spinous dorsal fin. The latter commences a little nearer to the caudal fin than to the snout, above the eighth scale of the lateral line; the length of its anterior spine is more than one-half of that of the head, and if laid backwards, it extends nearly to the origin of the soft dorsal. The soft dorsal fin is twice as high as it is long, its height being three-fourths of the length of the head; it has some scales anteriorly, and if laid backwards, it extends nearly to the base of the caudal. Larger specimens than that from which I take the description may have these fins more remote from one another. The caudal is deeply emarginate, and its length is not quite one-fourth of the total. The anterior third of the anal falls before the origin of the dorsal opposite; it is as high as, and longer than, the last fin mentioned.



M. hypselopterus.

Colour greenish, shining golden; top of the dorsal fins blackish.

49. Mugil compressus.

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 28. L. transv. 10.

Adipose eyelid none; upper lip rather thin. The greatest depth of the body is below the spinous dorsal, where it is contained four times and two-thirds in the total length. The extremity of the maxillary is conspicuous behind and below the angle of the mouth. The two anterior dorsal spines of nearly equal length and strength.

New South Wales.

a. One foot long. Presented by the Medical Officers R. A.—Two other specimens are in the Fort Pitt Collection.

Description of the specimen.—The head is rather elongate and depressed, its length being one-fifth of the total, and its depth three-fifths of its length. The body is strongly compressed, especially on its posterior portion; the least depth of the free portion of the tail is one-half of the length of the head. The interorbital space is very slightly convex, and its width is two-fifths of the length of the head. Snout broad, obtuse, rather longer than the eye. The angle made by the front margins of the mandibulary bones is obtuse, the depth of the cleft of the mouth being two-fifths of its width. The free space at the chin, between the two mandibles, is short, lanceolate, as in *M. hypselopterus*, only rather narrower. The teeth of the upper lip are minute, scarcely visible; lower labial teeth none. The maxillary is bent downwards below and behind the angle of the mouth, where its extremity is visible; the præorbital is scaly, with a shallow notch anteriorly, and with its margins very distinctly serrated; its extremity is obliquely truncated, so that the anterior angle is pointed and the posterior obtuse. The nostrils are close together, and the posterior is nearer to the anterior than to the orbit. A deep groove before the vomer.

The pectoral fin is inserted a little above the middle of the depth of the body, and has no elongate pointed scale in its axil; it extends to the ninth scale of the lateral line, and its length equals the distance of the opercular margin from the front nostril. The base of the ventral is somewhat nearer to that of the pectoral than to the vertical from the dorsal; it is comparatively large, its length being equal to the distance of the opercular margin from the front edge of the orbit; its spine is strong; the pointed scale in its axil short. There are eighteen series of scales between the snout and the spinous dorsal fin; the latter commences somewhat nearer to the caudal fin than to the snout, above the eighth scale of the lateral line; the length of its two anterior dorsal spines is two-thirds of that of the head, but they do not extend to the origin of the soft dorsal, if laid backwards. The soft dorsal and anal fins are scaly anteriorly; the former commences above the sixteenth scale of the lateral line, or above the fifth soft ray of the anal fin. The anal fin is higher than the spinous dorsal, and much higher than long. The caudal is deeply emarginate, with the lobes equal in length, not quite one-fourth of the total. The scales are large, semielliptical, with a short longitudinal groove in the centre, and with several others on the basal portion.

50. Mugil melinopterus.

Cuv. & Val. xi. p. 146. pl. 314.

D. $4 \,\Big|\, \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 25. L. transv. 10.

The height of the body is contained four times and two-thirds in the total length, the length of the head four times and one-third. Head much longer than high; the upper anterior profile is curved. Interorbital space flat, broad, its width being nearly one-half of the length of the head. Snout broad, obtuse, depressed, as long as the eye. The upper lip is moderately thick, forming the front margin of the snout. The cleft of the mouth is not quite three times as broad as it is deep; the free space at the chin, between the mandibles, is short, narrow, lanceolate; the angle made by the front margins of the mandibles is obtuse. The præorbital is scaly, angularly bent, and has the extremity truncated and serrated; extremity of the maxillary visible behind and below the angle of the mouth. Eye without adipose membrane. The spinous dorsal commences nearer to the base of the caudal fin than to the snout, above the ninth scale of the lateral line; its first spine is considerably stronger and longer than the second, its length being two-thirds of that of the head. The soft dorsal is lower than the spinous, and than the tail below, and commences above the sixteenth scale, or above the middle of the anal fin. Caudal slightly emarginate. The anal is nearly as high as the spinous dorsal, and scaly at the base, like the soft dorsal. The pectoral is inserted a little above the middle of the depth of the body, and has no pointed scale in its axil; it is shorter than the head, the length of the snout not included.

Vanicolo. Tonga Islands.

a, b–c. Half-grown and young. Tonga Islands. From the Haslar Collection.

51. Mugil decem-radiatus.

? Mugil parsia, *Bleek. Timor*, p. 166; (not *Buch. Ham.*).

D. $4 \,\Big|\, \frac{1}{8}$. A. $\frac{3}{10}$. L. lat. 40–45.

The height of the body is nearly equal to the length of the head, and contained four times and a half or five times in the total length. Eye without adipose membrane; the snout convex, obtuse, shorter than the eye; lips thin; the maxillary is entirely hidden when the mouth is closed. Caudal emarginate. Pectoral with a black spot superiorly at the base. (*Bl.*)

Coasts of Batavia and Timor.

52. Mugil peronii.

Cuv. & Val. xi. p. 138.

D. $4 \,\Big|\, \frac{1}{9}$. A. $\frac{3}{10}$. Cæc. pylor. 2.

The upper profile is straight; snout longer than the eye; the maxillary is not entirely hidden by the præorbital; no pointed scale in the axil of the pectoral fin. (*Val.*)

North-west coast of New Holland.

53. Mugil falcipinnis.

Cuv. & Val. xi. p. 105.

D. $4 \mid \frac{1}{9}$. A. $\frac{3}{11}$. Cæc. pylor. 17.

Eyes without adipose membrane. The præorbital is not obliquely truncated and covers entirely the maxillary bone. No large scale in the axil of the pectoral. Root of the pectoral above the middle of the body; anal emarginate. (*Val.*)

Senegal.

54. Mugil broussonetii.

Cuv. & Val. xi. p. 117.

D. $4 \mid \frac{1}{9}$. A. $\frac{3}{9}$.

The height of the body equals the length of the head, and is one-fifth of the total. Eyes with an adipose membrane; maxillary hidden. The upper lip is thick, produced posteriorly into a prominence which is received between the two nasal bones. Pectoral shorter than the head; the soft dorsal and anal scaly; caudal emarginate. (*Val.*)

South Sea.

55. Mugil labeo.

Sabounie (Nice).

Mugil labeo, *Cuv. Règne Anim.*; *Bonap. Faun. Ital. Pesc.*; *Cuv. & Val.* xi. p. 55. pl. 310.

—— provensalis, var. A, *Risso, Ichth. Nice*, p. 346.

—— provençalis, *Risso, Eur. Mérid.* iii. p. 391.

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{11}$. Cæc. pylor. 7.

The height of the body is contained four times and a half in the total length, the length of the head five times. The snout is broad, moderately depressed; the interorbital space slightly convex, its width being nearly one-half of the length of the head. The upper lip is very thick, the lower slightly notched before the symphysis; the angle made by the two mandibulary bones is very obtuse; the præorbital does not entirely cover the maxillary bone. Eyes without adipose membrane; nostrils close together, and less distant from each other than the posterior is from the eye. The chin is entirely covered by the mandibularies, or they leave between them only an exceedingly narrow strip uncovered. The length of the two anterior dorsal spines is contained twice and a half in that of the head. The pectoral terminates at some distance from the vertical from the origin of the dorsal, and its root is above the middle of the body. Dark shining stripes along the series of scales.

Mediterranean.

56. Mugil labiosus.

Cuv. & Val. xi. p. 125; *Bleek. Timor*, ii. p. 213, and *Act. Soc. Sc. Indo-Nederl.* viii., *Sumatra*, ix. p. 6.

D. $4 \,\Big|\, \frac{1}{7}$. A. $\frac{3}{9\text{–}10}$. L. lat. 36.

The height of the body equals the length of the head, and is one-fifth of the total. Upper lip very thick, especially on the sides, and with a fold, but without fringes. The width of the interorbital space is two-fifths of the length of the head. The snout projects beyond the mouth; the præorbital is strongly emarginate anteriorly, and does not entirely cover the maxillary. The lower jaw has a very distinct notch at the symphysis, but scarcely any trace of a tubercle. The pectoral is a little longer than the head; the posterior dorsal and the anal fins are scaly; caudal emarginate. A small blackish spot superiorly at the base of the pectoral.

Red Sea. Coasts of Timor and Sumatra.

57. Mugil chelo.

Lisa (Ivica); Buosega (Venice); Cefalo pietra (Rome); Sciorina (Florence); Tainha da Moda (Madeira).

Chelon, *Rondel. Pisc.* i. lib. ix. c. 5. p. 266; *Gesner, Aquat.* iv. p. 552; *Willughby*, iv. c. 4; *Ray, Syn.* p. 84.

Mulet Chaluc, *Duham. Pêches*, iii. sect. 6. c. 2. p. 147.

Mugil chelo, *Cuv. Règne Anim.*; *Bonap. Faun. Ital. Pesc.*; *Cuv. & Val.* xi. p. 50. pl. 309; *Jen. Man.* p. 375; *Guichen. Explor. Algér. Poiss.* p. 67; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 395.

—— provensalis, *Risso, Ichth. Nice*, p. 346; (not *Eur. Mérid.*).

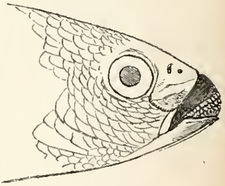
—— labrosus, *Risso, Eur. Mérid.* iii. p. 389.

—— cephalus, var. B, *De la Roche, Ann. Mus.* xiii. p. 358. tab. 21. fig. 7.

—— corrugatus, *Lowe, Trans. Zool. Soc.* ii. p. 184, and *Fish. Madeir.* p. 155.

D. 4/9. A. $\frac{3}{9}$. L. lat. 45. L. transv. 15–16. Cæc. pylor. 7. Vert. 11/13.

The height of the body is contained four times and two-thirds or five times in the total length, the length of the head five times and a half. The snout is broad and depressed; the interorbital space slightly convex, its width being nearly one-half of the length of the head. The upper lip is very thick, with three series of short broad papillæ on its inferior half. The angle made by the two mandibulary bones is obtuse; the præorbital has an indistinct longitudinal ridge, and does not entirely cover the maxillary bone; its extremity is rounded, the anterior angle being not much wider than the posterior. Eyes without adipose membrane: nostrils close together; they are less distant from each other than the posterior is from the eye. The chin is entirely



M. chelo.

covered by the mandibularies, or they leave between them only a very narrow strip uncovered. There are twenty-eight scales between the snout and the spinous dorsal. The two anterior dorsal spines exceed one-half of the length of the head. The thirteenth, the fourteenth or fifteenth, and the twenty-sixth or twenty-seventh scales of the lateral line correspond to the extremity of the pectoral and to the origin of the two dorsal fins; the origin of the spinous dorsal is nearer to the caudal than to the snout. The root of the pectoral is somewhat above the middle of the body; the ventral is inserted midway between the pectoral and spinous dorsal. Dark stripes along the series of scales.

Mediterranean. Madeira. Canary Islands.

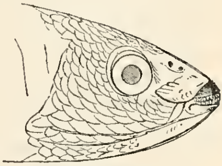
a. Adult. Lanzarote. Presented by the Rev. R. T. Lowe.
b–c. Young. Mediterranean. From Mr. Petherick's Collection.—Young individuals of this and the following species have the labial papillæ very little developed.

58. Mugil septentrionalis.

Mugil cephalus, *Schagerstr. Vet. Akad. Handl.* 1829, p. 90. tab. 3. fig. 1.
—— capito, *Nilss. Prodr.* p. 69.
—— chelo, *Yarr. Brit. Fishes*, i. p. 207, 2nd edit. i. p. 241, 3rd edit. ii. p. 182 (not the figure which has been copied from *Bonaparte* and belongs to the true *chelo*); *Thomps. Nat. Hist. Irel.* iii. p. 100; *Parn. Wern. Mem.* vii. p. 228, or *Fishes Frith of Forth*, p. 68 (pl. 28 is a copy from *Cuv. & Val.*, and represents *M. chelo*); *Nilss. Faun. Skand.* iv. p. 177.

D. $4 \,\big|\, \frac{1}{8}$. A. $\frac{3}{9\,(10)}$. L. lat. 45. L. transv. 16. Cæc. pylor. 5. Vert. 11/13.

The height of the body is contained four times and a half to four times and two-thirds in the total length, the length of the head five times or five times and a half. The upper lip is thick, with two series of short and obtuse papillæ on its inferior third. The extremity of the maxillary is visible behind and below the angle of the mouth. The præorbital is very obliquely truncated, so that its posterior angle is pointed, whilst the anterior is very obtuse and rounded. Mandibles very broad, nearly entirely covering the chin. The tenth, the fifteenth, and the twenty-seventh scales of the lateral line correspond to the extremity of the pectoral and to the origin of the two dorsal fins; the origin of the spinous dorsal is exactly on the middle between the snout and the base of the caudal. Dark stripes along the series of scales.



M. septentrionalis.

British and Scandinavian coasts.

a. Adult: stuffed. Frith of Forth.

b–d, *e*. Adult, half-grown, and young. England. Purchased.

f. Half-grown: skin. London market. From Mr. Yarrell's Collection.

g. Preparation of the pharyngeal apparatus and of the intestines of male and female. Presented by Dr. A. Günther.

h, *i*. Adult: skeletons. England.

Description.—The height of the body is contained four times and a half to four times and two-thirds in the total length, the length of the head five times to five times and a half. The head is somewhat elevated and short, the snout being obtuse. The interorbital space is convex, and its width is one-half of the length of the head. The upper lip is thick, but thinner than in *M. chelo*; its inferior third has a whitish colour, and is provided with two series of short and flat papillæ. The angle made by the anterior margins of the mandibles is obtuse, and the cleft of the mouth is at least thrice as broad as it is deep. A long portion of the maxillary is visible behind and below the angle of the mouth. The præorbital is much more obliquely truncated than in *M. chelo*, its hinder angle being pointed, whilst the anterior is very obtuse and more or less rounded; the edge between the two angles is minutely serrated. The mandibles are very broad, and nearly entirely cover the chin; but a very narrow strip of the chin always appears to remain uncovered even in very old individuals. The nostrils are close together, situated nearer to the orbits than to the end of the snout. Adipose eyelid none. There are twenty-six scales between the snout and the spinous dorsal fin; the latter commences exactly on the middle between the snout and the base of the caudal fin, the tail of this species being somewhat longer than in *M. chelo*; the two anterior dorsal spines are rather stout, of equal length, and one-half as long as the head; pointed scales extend along the whole length of its base. The soft dorsal fin is higher than the spinous, and commences above the twenty-seventh scale of the lateral line, or above the first soft ray of the anal. The caudal fin is forked, the length of each lobe being equal to, or rather more than, that of the head. Anal as high as the fin opposite. The pectoral is inserted somewhat above the middle of the depth of the body, and has no pointed scale in its axil; it is considerably shorter than in *M. chelo*, extending only to the tenth scale of the lateral line, whilst the origin of the spinous dorsal corresponds to the fifteenth; its length is nearly equal to the distance of the posterior nostril from the end of the operculum. The ventral is inserted midway between pectoral and dorsal fins.

Back greenish, lighter on the sides and silvery below; dark greenish stripes along the series of scales.

Length of the largest specimen twenty-three inches.

On the anatomy, see p. 410.

This species is closely allied to *M. chelo*, with which it has hitherto been confounded; but it may be readily distinguished by its shorter pectoral fin, its thinner upper lip, the different form of the præorbital, and its longer tail. It has two pyloric appendages less.

59. Mugil nigro-strigatus.

D. 4 | $\frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 42. L. transv. 13–14.

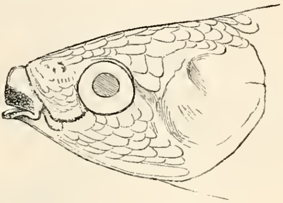
The upper lip is excessively thick, without transverse fold, and with about seven series of small flat papillæ on its inferior half; the lower lip has a broad membranaceous margin, notched in the middle, but not ciliated. Body with about eleven brownish-black longitudinal streaks.

Hab. —— ?

a. Seven inches long. Borneo. Presented by Vice-Admiral Sir E. Belcher, K.C.B.

b. Six inches long. St. Vincent's. Presented by the Lords of the Admiralty.

Description.—The height of the body is contained four times and two-thirds in the total length, the length of the head five times. The interorbital space is slightly convex, its width being twice and a fourth in the length of the head. The snout is as long as, or somewhat longer than, the eye. The chin is nearly entirely covered by the mandibles. The præorbital is truncated, not notched, and does not cover the extremity of the maxillary. The pectoral is inserted nearly in the middle of the depth of the body, and is without a pointed scale in its axil; it is not quite so long as the head, and extends to the fourteenth scale of the lateral line. There are twenty-seven scales between the snout and the spinous dorsal. The latter commences midway between snout and base of the caudal, above the sixteenth scale of the lateral line, the soft dorsal above the twenty-sixth, or above the third soft anal ray. The soft dorsal is not scaly, much higher than long, and as high as the anal. Caudal emarginate. Anal longer than the dorsal.



M. nigro-strigatus.

The black stripes are produced by a series of spots, one always belonging to the cuticular fold, covering the base of a scale.

I am inclined to think the statement of one of the specimens coming from Borneo to be incorrect, and that the species is a native of the coast of St. Vincent's, West Indies.

60. Mugil heterochilus.

Bleeker, Batjan, ii. p. 198, and *Act. Soc. Sc. Indo-Nederl.* vi., *Celebes,* xiii. p. 57.

D. 4 | $\frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 40. L. transv. 12.

The height of the body equals the length of the head, and is one-fifth of the total. Eyes without adipose membrane. Snout obtuse, not projecting beyond the mouth, shorter than the eye. The upper lip is very thick, with obtuse indistinct papillæ inferiorly; the lower without fringes, notched at the symphysis. The præorbital is scarcely emarginate anteriorly, and does not entirely cover the maxillary. The pectorals are nearly as long as the head; the soft dorsal and the anal are scaly; the latter commences before the dorsal. Caudal deeply emarginate. A black spot sometimes superiorly at the base of the pectoral. (*Bl.*)

Coasts and rivers of Batjan, Celebes, Ceram, and Java.

61. Mugil crenilabis.

Mugil crenilabis, *Forsk. Descr. Anim.* p. 73; *Cuv. & Val.* xi. p. 123; (not *Rüpp.*).
—— fasciatus, *Cuv. & Val.* xi. p. 125.

$$D.\ 4 \,\Big|\, \frac{1}{8}. \quad A.\ \frac{3}{9}.$$

The height of the body is contained four times and a third in the total length, the length of the head five times. The upper lip is very thick, with small fleshy fringes; the lower notched before the symphysis and also fringed. The maxillary is entirely hidden by the præorbital; præorbital not notched anteriorly. Eyes without adipose membrane. The second dorsal and the anal are scaly; caudal forked.

Red Sea.

62. Mugil macrochilus.

Mugil, sp., *Jenyns, Zool. Beagle, Fishes,* p. 81.
Mugil macrocheilos, *Bleek. Kokos,* p. 43.

$$D.\ 4 \,\Big|\, \frac{1}{7}. \quad A.\ \frac{3}{9}. \quad L.\ lat.\ 41\text{–}42.$$

The height of the body is contained five times and one-fourth in the total length, the length of the head five times and two-fifths; the width of the interorbital space is one-half of the latter. The snout is obtuse, projecting beyond the mouth, and as long as the eye. Both lips are fringed; the upper is very thick, its fringes standing in a single series, obtuse and denticulated. The præorbital has no notch anteriorly, and the maxillary is nearly entirely hidden when the mouth is closed. Eyes without adipose membrane. The pectoral is nearly as long as the head; the second dorsal and the anal are scaly, and both commence in nearly the same vertical. Caudal forked; a blackish spot superiorly at the base of the pectoral. (*Bl.*)

Coasts of Kokos Island and of Java.

63. Mugil rüppellii.

Mugil crenilabris, *Rüpp. N. W. Fische,* p. 132; (not *Cuv. & Val.*).

$$D.\ 4 \,\Big|\, \frac{1}{8}. \quad A.\ \frac{3}{9}. \quad L.\ lat.\ 40. \quad L.\ transv.\ 14.$$

The height of the body is contained four times and a half in the total length, the length of the head five times. The snout is broad, short, obtuse, not depressed; the interorbital space slightly convex, its width being contained twice and a quarter in the length of the head. The upper lip is very thick, and, like the lower, fringed; the two mandibulary bones do not leave a free space between them: the præorbital has a very distinct notch anteriorly; its extremity is truncated, and does not cover that of the maxillary. Eyes without adipose membrane. There are twenty-one scales between the snout and the spinous dorsal. The length of the anterior dorsal spines is one-half of that of the head. The eleventh, the twelfth, and the twenty-fourth scales of the lateral line correspond to the extremity of the pectoral and to the origin of the two dorsal fins. Caudal forked; the second dorsal and the anal scaly.

Red Sea.

a. Stuffed. One of Dr. Rüppell's typical specimens.

64. Mugil cirrhostoma.

Mugil cirrhostoma, (*Forsk.*) *Bl. Schn.* p. 121; *Cuv. & Val.* xi. p. 127. pl. 312.

D. $4 \,\big|\, \frac{1}{8}$. A. $\frac{3}{10}$. L. lat. 30–35.

The height of the body is contained four times and three-fourths in the total length, the length of the head nearly six times. Lips very thick, the upper with nine or ten, the lower with two series of short fleshy fringes. The præorbital is not notched anteriorly, and scarcely denticulated. Pectoral as long as the head; the second dorsal and anal scaly; the caudal forked. (*Val.*)

New Ireland.

65. Mugil proboscideus.

D. $4 \,\big|\, \frac{1}{8}$. A. $\frac{3}{10}$. L. lat. 38. L. transv. 14.

The front part of the upper lip is extremely thick, conically produced; the lower parts of both lips with a band of soft pavement-like papillæ, arranged in oblique series. Cleft of the mouth deeper than broad.

Coasts of Nicaragua. Pacific coast of Central America.

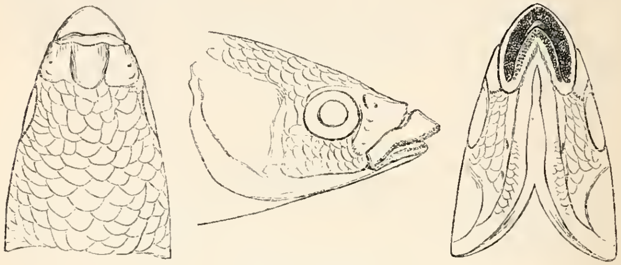
a. Forty-five lines long. Island of Cordova. Presented by G. U. Skinner, Esq.

b–m. Young. Island of Cordova. Presented by G. U. Skinner, Esq.

n. Four inches long. West coast of Central America. Collected by Captain Dow; presented by Dr. P. L. Sclater, Secr. Zool. Soc.

Description.—This species is naturally more closely allied to *Agonostoma plicatile* than to *Mugil*, but differs from it in having no teeth at all in the jaws, except that in specimen *n*. the band of papillæ passes into a series of fine moveable teeth anteriorly in the upper jaw. The head and especially the body and tail are compressed; the greatest depth of the body nearly equals the length of the head, and is contained four times and a half in the total length.

The upper anterior profile is nearly straight, obliquely descending. The interorbital space is convex, one-half of the length of the head, and scaly, whilst the parts before the orbits are naked. The anterior portion of the upper lip is extremely thick, conically protruding, and nearly as long as the remainder of the snout. A narrow band of soft papillæ occupies the lower parts of the lips anteriorly and laterally; the papillæ are arranged in oblique series, having a pavement-like appearance. The lower jaws are rather narrow, and the cleft of the mouth is much longer than broad. The maxillary is entirely hidden by the præorbital, which has the extremity truncated and minutely serrated. The eye is much shorter than the snout, and in the present specimen, which apparently is a young one, one-fourth of the length of the head. There are twenty-three scales between the snout and the spinous dorsal fin. The latter commences somewhat nearer to the base of the caudal than to the end of the snout: the soft dorsal and the anal have series of small scales between the rays; the former is higher than the spinous dorsal, and commences above the middle of the anal fin. Caudal emarginate; the anal is rather higher than long, as high as the soft dorsal. The pectoral is inserted above the middle of the depth of the body, and its length is four-fifths of that of the head.



M. proboscideus.

Silvery, upper parts greenish; dark stripes along the series of scales.

66. Mugil corsula.

Buch. Ham. Fish. Gang. pp. 221, 381. tab. 9. fig. 97; *Cuv. & Val.* xi. p. 119; *Bleek. Verhand. Batav. Genootsch.* xxv., *Bengal. en Hindost.* p. 101; *Eyd. & Soul. Voy. Bonite, Zool.* i. p. 172. pl. 4. fig. 2.

D. 4 | $\frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 52. L. transv. 15. Cæc. pylor. 2.

The snout is flat, rounded, prominent, with the upper part projecting beyond the mouth, which is entirely at the lower side of the head. Head flat superiorly, elongate, triangular; the eyes are rather small and somewhat directed upwards, and the space between them is nearly one-sixth of the length of the head; nostrils on the side of the snout, below the canthus rostralis. The height of the body is contained six times in the total length, the length of the head five times and a half. Dorsal spines somewhat feeble, the anterior ones being nearly one-third of the length of the head; the origin of the second dorsal fin is above the middle of the anal.

Ganges and tributaries.

a. Adult: stuffed. Calcutta. Purchased of Mr. Bartlett.

2. AGONOSTOMA.

Agonostomus, *Benn. Proc. Comm. Zool. Soc.* 1830, p. 166.
Cestræus, *Cuv. & Val.* xi. p. 156.
Dajaus, *Cuv. & Val.* xi. p. 164.
Nestis, *Cuv. & Val.* xi. p. 166.

Cleft of the mouth extending on the sides of the snout, beyond, to, or nearly to the orbit. Small teeth at least in one of the jaws, and sometimes on the palate. The lower lip with the margin rounded, not sharp. Stomach not particularly muscular.

Fresh waters of the West Indies, Central America, New Zealand, Australia, Celebes, Mauritius, and the Comora Islands.

1. Agonostoma plicatile.

Cestræus plicatilis, *Cuv. & Val.* xi. p. 157. pl. 315.

D. $4\,\big|\,\frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 44. L. transv. 13. Cæc. pylor. 2.

Small teeth in the upper jaw; no other teeth. The height of the body is contained four times and a third in the total length. Eye without adipose membrane. Upper lip very thick, with numerous small papillæ; the lower with transverse lamellæ.

Fresh waters of Celebes and of Aneiteum.

a. Adult: stuffed. Aneiteum. From Mr. Macgillivray's Collection.—This specimen differs from that described by Valenciennes in having the præorbital slightly serrated, and a blackish blotch on the top of the second dorsal fin. It belongs, perhaps, to a different species.

2. Agonostoma oxyrhynchum.

Cestræus oxyrhynchus, *Cuv. & Val.* xi. p. 162; *Bleek. Celeb.* viii. p. 307, and *Act. Soc. Sc. Indo-Nederl.* viii., *Sumatra,* ix. p. 9.

D. $4\,\big|\,\frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 45. Cæc. pylor. 2.

The height of the body is contained five times and a fourth or five times and a half in the total length. Eye without developed adipose membrane. Lips thick; the upper without papillæ, the lower with inconspicuous transverse lamellæ. A small patch of teeth on each side of the vomer; those of the upper jaw small, none in the lower.

Fresh waters of Celebes, Batjan, and Sumatra.

3. Agonostoma telfairii.

Agonostomus telfairii, *Benn. Proc. Comm. Zool. Soc.* i. 1830, p. 166.
Nestis cyprinoides, *Cuv. & Val.* xi. p. 167. pl. 317.

$$\mathrm{D.}\ 4 \left| \frac{1}{8}. \right. \quad \mathrm{A.}\ \frac{3}{9}. \quad \mathrm{L.\ lat.}\ 45. \quad \mathrm{L.\ transv.}\ 13.$$

Villiform teeth in the jaws, on the vomer and the pterygoid bones, none on the palatines. The height of the body is one-fifth of the total length, the length of the head nearly one-sixth. The front part of the upper lip is rather thick, not protruding; snout as long as the orbit. The anterior dorsal commences somewhat nearer to the snout than to the base of the caudal. Upper parts dark-coloured; a silvery band along the side.

Mauritius. Comoro Islands.

a–c. Young. Anjuan. From Prof. Peters's Collection.
d. Half-grown. Mauritius. From Mr. Gerrard's Collection.—Type of the species.

4. Agonostoma dobuloides.

Nestis dobuloides, *Cuv. & Val.* xi. p. 171.

$$\mathrm{D.}\ 4 \left| \frac{1}{8}. \right. \quad \mathrm{A.}\ \frac{2}{9}.$$

Very small teeth in the upper jaw and on the vomer, none in the lower and on the palatine bones. Upper lip thick. (*Val.*)

Mauritius.

5. Agonostoma microps.

$$\mathrm{D.}\ 4 \left| \frac{1}{8}. \right. \quad \mathrm{A.}\ \frac{3}{9}. \quad \mathrm{L.\ lat.}\ 43. \quad \mathrm{L.\ transv.}\ 12.$$

Broad bands of villiform teeth in the jaws, on the vomer, the palatine and pterygoid bones. The height of the body is contained five times in the total length, the length of the head four times and a half; the latter is more than the distance between the origins of the two dorsal fins; snout much longer than the eye. Upper lip thick, protruding anteriorly. The maxillary extends to, or beyond, the vertical from the anterior margin of the eye. The interorbital space is convex. The anterior dorsal commences midway between the snout and the base of the caudal fin.

Probably West Indies.

Twelve inches long.

a, b. Adult and half-grown. From the Collection of the Zoological Society.

Description.—The body is moderately compressed, its greatest depth being one-fifth of the total length; its upper anterior profile is very slightly convex, obliquely descending; the length of the head is contained four times and a half in the total. The interorbital space is convex, its width being nearly one-third of the length of the head. The snout is conical, twice as long as the eye, the diameter of which is one-sixth of the length of the head. The upper lip is thick, especially its front part, which projects beyond the lower jaw. The cleft of the mouth is slightly oblique, and of moderate width, the maxillary extending to below the anterior margin of the eye; it is not entirely hidden when the mouth is closed, but a narrow strip of its cutaneous covering remains visible. The præorbital reaches downwards to the lower level of the orbit, and is not denticulated. There are nineteen scales between the spinous dorsal and the crown of the head; those on the crown are covered with skin, and the interorbital space is entirely naked. The spinous dorsal fin commences midway between the snout and the base of the caudal fin, above the tenth scale of the lateral line; its anterior spines are stout, their length being a little less than one-half of that of the head. The soft dorsal is a little higher than the spinous, not scaly, and commences above the twenty-fourth scale, or above the fourth soft anal ray. Caudal emarginate. The anal fin is somewhat higher than the dorsal opposite, and has its anterior spine very short. The pectoral is inserted on the middle of the depth of the body, and is as long as the head, the length of the snout not included; it extends to the ninth scale.

Back greyish-green, each scale with a brown margin; a silvery band from above the pectoral to the base of the caudal; lower parts silvery.

6. Agonostoma nasutum.

D. $4 \mid \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 42. L. transv. 12.

Rather narrow bands of villiform teeth in the jaws, on the vomer and palatine bones. The height of the body equals the length of the head, and is one-fifth of the total. Upper lip thick. The maxillary extends to the vertical from the anterior margin of the eye. The interorbital space is convex. The anterior dorsal commences nearer to the end of the snout than to the base of the caudal fin.

Rivers of Guatemala.

a. Eight and a half inches long. River of San Geronimo. From Mr. Owen's Collection.

Description of the specimen.—The body is moderately compressed, rather thick behind the head, its greatest depth being equal to the length of the head, and one-fifth of the total; its upper anterior profile is slightly convex above the opercles. The interorbital space is convex, and its width is contained twice and two-thirds in the length of the head. The snout is obtusely conical, the diameter of the eye being two-thirds of its extent, or one-fifth of the length of the entire head. The upper lip is thick, especially its front part, which extends to the upper surface of the head and projects beyond the lower jaw. The cleft of the mouth is slightly oblique, of moderate width, the maxillary extending to below the anterior margin of the eye; the maxillary is entirely hidden when the mouth is closed. Præorbital without denticulation. Narrow bands of villiform teeth in the jaws, on the vomer and on the palatine bones. There are nineteen scales between the spinous dorsal and the snout, the scales extending to the level of the anterior margin of the orbits. The spinous dorsal commences nearer to the end of the snout than to the base of the caudal fin, above the tenth scale of the lateral line; its anterior spines are rather strong, their length being a little more than one-half of that of the head. The soft dorsal is a little higher than the spinous, not scaly, and commences above the twenty-fourth scale, or above the fourth soft anal ray. Caudal fin emarginate. The anal fin is somewhat higher than the dorsal opposite, having feeble spines, the anterior being quite rudimentary. The pectoral is inserted above the middle of the depth of the body, and equal in length to the distance of the nostril from the posterior margin of the operculum; it extends nearly to the tenth scale.

Back greyish-green, each scale with a brown margin; a silvery band from the base of the pectoral to the caudal fin; lower parts silvery; base of the pectoral blackish.

This species is so closely allied to *Agonostoma telfairii* from the Mauritius, that it requires a minute examination to distinguish them. The snout of the American species is comparatively shorter and the spinous dorsal fin is situated more forwards.

The fish was discovered by Mr. Owen, who, in company with Messrs. Salvin and Godman, is at present engaged in investigating the natural productions of Guatemala.

7. Agonostoma monticola.

Mugil monticola, (*Bancroft*) *Griff. Anim. Kingd. Fishes*, p. 367. pl. 36.
Dajaus monticola, *Cuv. & Val.* xi. p. 164. pl. 316.
Mugil irretitus, *Gosse, Nat. Soj. Jamaica*, p. 84.

D. $4 \,\Big|\, \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 40–42. L. transv. 12.

Small teeth in the jaws, on the vomer and the palatine bones. The height of the body is contained four times and a third to four times and a half in the total length. Upper lip thin. The maxillary extends to the vertical from the anterior margin of the eye. The interorbital space is convex. The anterior dorsal commences somewhat nearer to the snout than to the base of the caudal fin.

Fresh waters of the West Indies and of Mexico.

a. Adult. Barbadoes. Purchased of Mr. Cuming.
b–e. Half-grown: skins. Jamaica. From Dr. Parnell's Collection.
f. Young. Bluefields, Jamaica. From Mr. Gosse's Collection, and type of his *Mugil irretitus*.
g–h. Adult: stuffed. West Indies.
i. Half-grown. Mexico. From M. Sallé's Collection.
k–n. Adult.

8. Agonostoma percoides.

D. $4 \,\Big|\, \frac{1}{8}$. A. $\frac{3}{9}$. L. lat. 40–42. L. transv. 13.

Villiform teeth in the jaws, on the vomer and the palatine bones. The height of the body is contained four times and a third to four times and a half in the total length. Upper lip thin. The maxillary extends beyond the vertical from the anterior margin of the eye. The interorbital space is flat. The anterior dorsal commences midway between the snout and the base of the caudal fin.

Fresh waters of San Domingo and probably of Jamaica. Nine inches long.

a. Adult female. San Domingo. Purchased of Mr. Cuming.
b–e. Adult and half-grown: skins. Jamaica? From Dr. Parnell's Collection.
f. Adult. West Indies. Presented by the Medical Officers, R.A., at Fort Pitt.

Description.—This species is nearly allied to *A. monticola*, from which it may be readily distinguished by the characters mentioned; it is necessary, however, to give a more detailed description, as probably more species will be discovered. The body is moderately compressed, with the upper anterior profile considerably arched; its greatest depth is below the origin of the spinous dorsal, where it is contained four times and a third or four times and a half in the total length. The length of the head is nearly equal to the height of the body, or contained three times and two-thirds in the total length, the caudal fin not included. The interorbital space is quite flat, its width being rather more than that of the orbit, which equals the extent of the snout, and is one-fourth of the length of the head. The snout is compressed, with thin lips, and with the cleft of the mouth horizontal; the maxillary extends beyond the vertical from the anterior margin of the eye. The nostrils are close together, the anterior being on the middle between the end of the snout and the orbit. There are four series of scales between the orbit and the angle of the præoperculum, sixteen between the snout and the spinous dorsal fin. The latter commences midway between the snout and the base of the caudal, above the tenth scale of the lateral line; the length of its anterior spine is more than one-half of that of the head. The soft dorsal is as high as the spinous, and commences above the twenty-second scale, or above the third soft ray of the anal. Caudal deeply emarginate; anal higher than the dorsal opposite. The pectoral is inserted above the middle of the depth of the body, and extends to the ninth scale of the lateral line; it is as long as the head, the length of the snout not included; the ventral is somewhat shorter than the pectoral.

Nearly uniform greenish (in spirits); blackish blotches between the dorsal spines.

Length of a mature female six inches; the species, however, attains to a larger size.

9. Agonostoma forsteri.

Mugil albula, *Forst. Descr. Anim. ed. Licht.* p. 145.
—— forsteri, *Bl. Schn.* p. 120; *Cuv. & Val.* xi. p. 141; *Richards. Voy. Ereb. & Terr. Fishes*, p. 77. pl. 44. figs. 20–26 (young).
Dajaus diemensis, *Richards. Proc. Zool. Soc.* 1840, p. 25, and *Trans. Zool. Soc.* iii. p. 123, and *Voy. Ereb. & Terr. Fishes*, p. 37. pl. 26. figs. 1–4; *Jenyns, Zool. Beagle, Fishes*, p. 82.

D. $4 \mid \frac{1}{10}$. A. $\frac{3}{12}$. L. lat. 55. Cæc. pylor. 3.

Narrow bands of villiform teeth in the jaws, on the vomer, on the palatine and pterygoid bones. The height of the body is contained five times and a half in the total length, the length of the head four times and two-thirds. Interorbital space flat, its width being two-sevenths of the length of the head. Snout produced, rather longer than the eye; lips thin. Præorbital with the margins serrated; the maxillary extends to the vertical from the anterior margin of the orbit. The anterior dorsal spines rather slender, their length being one-half of that of the head; they occupy the middle of the distance between snout and base of the caudal. Caudal rather deeply emarginate.

Coasts and fresh waters of Van Diemen's Land and New Zealand.

a–b, c, d. Adult, half-grown, and young: bad state. From the Haslar Collection.—Probably the typical specimens of *Dajaus diemensis.*
e. Adult: bad state. Port Arthur. Presented by Sir J. Richardson.
f. Adult: skin. Hobson's Bay, Port Phillip.
g. Many young and half-grown specimens. New Zealand.

The original figure of Forster agrees so well with the specimens from the localities mentioned, that there is no occasion to distinguish a *Dajaus diemensis* from Forster's species.

3. MYXUS.

(? Mugil, sp., *Cuv. & Val.* xi. p. 149.)

Cleft of the mouth extending on to the sides of the snout, but not to the orbit. Small teeth in a single series in the upper jaw, and sometimes in the lower and on the palate. Upper lip not particularly thick; anterior margin of the mandible sharp.

1. Myxus elongatus.

D. $4 \left| \frac{1}{8} \right.$. A. $\frac{3}{9}$. L. lat. 45. L. transv. 13.

A single series of fine teeth in the upper jaw, none in the lower; vomer with a narrow cross-band of teeth; sometimes a very small patch anteriorly on the palatine bones. Lips thin. Præorbital serrated anteriorly and inferiorly. The anterior dorsal spine slender, its length being rather more than one-half of that of the head.

Coasts of Australia.

a. Skin: eleven inches long. Hobson's Bay. Presented by the Earl of Derby.
b. Skin: eleven inches long. Port Jackson. Purchased of Mr. Gould.

Although I have only two skins of this species, its characters are so marked that it will be readily recognized even from the incomplete description which I am enabled to give. The body appears to be more elongate than in the other species, its depth being about one-sixth of the total length. The head is long, about one-fifth of the total length, and flat above, the width of the interorbital space being contained twice and two-thirds in the length of the head.

Snout broad, approaching in form that of a true *Mugil*, with the lower lip somewhat sharp. The præorbital has a slight notch anteriorly, and has the margins serrated. The maxillary does not extend to below the orbit. The anterior dorsal has slender spines, and commences a little nearer to the base of the caudal than to the snout; the posterior dorsal commences behind the anal. Caudal deeply emarginate; vertical fins not scaly. A black spot superiorly in the axil of the pectoral fin.

2. **Myxus harengus.**

D. 4 | $\frac{1}{8}$. A. $\frac{3}{10}$. L. lat. 38.

A single series of small fixed teeth in the upper jaw, none in the lower or on the vomer; lips thin. Præorbital serrated anteriorly and inferiorly. Anterior dorsal spines of moderate strength, half as long as the head.

Pacific coast of Central America.

a–b. Twenty-two lines long. Collected by Captain Dow; presented by Dr. P. L. Sclater, Secr. Zool. Soc.

Head and body compressed, the greatest depth being about one-fifth of the total. The cleft of the mouth is rather broader than deep, and does not extend to the anterior margin of the orbit. Sides and belly bright silvery, back green.

The two following species, perhaps, belong to this genus :—

3. **Myxus curvidens.**

Mugil curvidens, *Cuv. & Val.* xi. p. 149. pl. 313.

D. 4 | $\frac{1}{8}$. A. $\frac{3}{9}$.

Teeth in both the jaws rather strong, in a single series, those of the lower having the points directed downwards, like the intermaxillary teeth. Eyes without adipose membrane; the maxillary is entirely hidden by the præorbital; vertical fins not scaly; no elongate scales in the axils of the fins. Base of the pectoral blackish. (*Val.*)

Island of Ascension. Bahia.

4. **Myxus ciliilabis.**

Mugil ciliilabis, *Cuv. & Val.* xi. p. 151.

D. 4 | $\frac{1}{8}$. A. $\frac{3}{9}$.

This species is thus described by Valenciennes :—It has the teeth smaller and finer than *M. curvidens*, to which it is closely allied; they are less recurved downwards, but form a series of cilia which have a different arrangement from that in the other species of *Mugil*. The back is more straight, the body more rounded, the head shorter, and the scales smaller than in *M. curvidens*.

Lima.

Fam. 39. OPHIOCEPHALIDÆ.

Labyrinthici, part., *Cuv. Règne Anim.*; *Müll. Berl. Abhandl.* 1844, p. 201.
Labyrinthibranchii, part., *Owen, Lect. Comp. Anat.* i. p. 49.
Ophiocephaloidei, *Bleek. Enum. Spec.* p. xxiv.

Body elongate, anteriorly subcylindrical, covered with scales of moderate size; head depressed, covered with shield-like scales superiorly; lateral line with an abrupt curve, or subinterrupted. Cleft of the mouth lateral, wide; teeth in the jaws and on the palate. Eye lateral. Gill-opening wide, the gill-membranes of both sides joined below the isthmus; four gills; pseudobranchiæ none. *A cavity accessory to the gill-cavity, for the purpose of retaining water in it*, a superbranchial organ not being developed. An air-bladder. *One long dorsal and anal fin, without spines*; ventral fins absent or thoracic, and composed of six rays, the outer of which is not branched. Vertebræ in considerable number (52–61); the caudal vertebræ are provided with ribs, the abdominal cavity being continued to below the caudal portion.

Freshwater fishes of the East Indies: able to live and move without the water for a short time. Feeding on small animals.

Every ichthyologist will acknowledge the necessity of separating these fishes from the *Labyrinthici*, their entire external and internal structure being widely different. The only character by which their position in this Order appears to be justified is the insertion and the structure of the ventral fins; they are composed of six rays, the outer of which is not even a true spine, but articulated towards its extremity.

Synopsis of the Genera.

Ventral fins present	1. Ophiocephalus, p. 468.
Ventral fins none	2. Channa, p. 483.

1. OPHIOCEPHALUS*.

Ophicephalus, *Bloch, Ausl. Fische*, viii. p. 137.

Ventral fins present. Pyloric appendages two. Fine teeth in the jaws, on the vomer and the palatine bones, sometimes intermixed with larger ones.

Fresh waters of the East Indies.

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* 1. Sowara, *Russ.* pl. 163.—Ophicephalus sowara, *Cuv. & Val.* vii. p. 426.—Vizagapatam.

2. Bostrichoides ocellatus, *Lacép.* iii. pp. 144, 145, ii. pl. 14. fig. 3.—Ophicephalus ocellatus, *Cuv. & Val.* vii. p. 434.—China.

Synopsis of the Species.

I. Shields on the upper surface of the head of moderate or large size. No ocellated spot in the adult state.

A. 29–37 dorsal rays.

1. O. punctatus.
2. O. affinis.
3. O. gachua.
4. O. kelaartii.

B. 38–45 dorsal rays.

a. L. lat. 50–58.

* Larger teeth none.

5. O. rhodotænia.

* Larger teeth in the lower jaw only.

6. O. mystax.
7. O. melanosoma.
8. O. melanopterus.
9. O. cyanospilos.
10. O. striatus.

* Larger teeth in the lower jaw, on the vomer and the palatine bones.

11. O. polylepis.

b. L. lat. 60–70.

12. O. bankanensis.
13. O. lucius.
14. O. siamensis.
15. O. obscurus.

C. 50–53 dorsal rays.

16. O. barca.
17. O. nigricans.
18. O. grandinosus.

II. A black ocellus on the caudal fin.

19. O. marulius.
20. O. pseudomarulius.
21. O. marulioides.
22. O. pleurophthalmus.

III. Shields on the upper surface of the head small.

23. O. argus.
24. O. maculatus.
25. O. micropeltes (stevensii).

1. **Ophiocephalus punctatus.**

Ophicephalus punctatus, *Bl.* taf. 358; *Bl. Schn.* p. 237; *Cuv. & Val.* vii. p. 404; *Bleek. Verhand. Batav. Genootsch.* xxv., *Bengal. en Hindost.* p. 95.

—— karrouvei, *Lacép.* iii. p. 552.

—— latus, *Buch. Ham. Fish. Gang.* pp. 63, 637. tab. 34. fig. 18.

—— indicus, *McClell. Calc. Journ. Nat. Hist.* ii. p. 583.

D. 29–31. A. 20–22. L. lat. 40. L. transv. 4/9.

Three or four large teeth on each side of the lower jaw. The

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3. Ophicephalus miliaris, *Cuv. & Val.* vii. p. 439.—China.
4. —— iris, *Cuv. & Val.* vii. p. 439.—China.
5. —— jovis, *Richards. Ichth. Chin.* p. 252.—China.
6. —— theophrasti, *Val. in Jacq. Voy. Ind. Poiss.* pl. 13. fig. 1.
7. —— leucopunctatus, *Sykes in Trans. Zool. Soc.* ii. p. 352. tab. 60. fig. 3. —Dekkan.

Philypnoides surakartensis, *Bleek. Blenn. en Gob.* p. 19, is, according to a communication from Dr. v. Bleeker, the young of some species of *Ophiocephalus*.

height of the body is contained six times in the total length, the length of the head three times and two-thirds, and that of the caudal fin five times and a half; the width of the head is three-fifths of its length. The width of the interorbital space is more than the extent of the snout, and contained four times and a half in the length of the head. The maxillary does not quite extend to the vertical from the posterior margin of the eye. There are five series of scales between the eye and the angle of the præoperculum. The pectoral extends to the origin of the anal fin, and its length is somewhat more than one-half of that of the head. The length of the ventral is nearly three-fourths of that of the pectoral. Body and tail with two series of alternate transverse blackish spots; a blackish streak from the eye to the scapula: these markings become indistinct with age. The lower half of the body with scattered black dots. Fins black or blackish; the dorsal and anal with longitudinal series of black spots.

Fresh waters of the East Indian Continent and of Ceylon.

a. Adult. Nepal. Presented by B. H. Hodgson, Esq.
b. Adult: stuffed. Loodianah. From Mr. Griffith's Collection.
c. Half-grown: skin. Dourra, Loodianah. Named *Ophiocephalus indicus*.
d. Adult: stuffed. Scharunpore. From Mr. Griffith's Collection, as *Ophiocephalus indicus*, Griff.
e–g, *h–i*. Adult, half-grown, and young. East Indies. Presented by G. R. Waterhouse, Esq.—Types of *Ophiocephalus lata*, B. H.
k, *l–m*, *n*, *o*, *p*, *q*, *r–s*, *t*. Adult, half-grown, and young. Ceylon.
u. Adult. From the Collection of the Zoological Society.

2. **Ophiocephalus affinis.**

D. 30. A. 22. L. lat. 38. L. transv. 4/8.

Several teeth in the lower jaw larger than the rest; those of the vomer cardiform, in a narrow band; a single series on the palatine bones. The height of the body is contained five times and three-fifths in the total length, the length of the head three times and three-fifths. The length of the caudal fin equals the height of the body. The width of the head is three-fifths of its length; the width of the interorbital space is more than the extent of the snout, and contained four times and a quarter in the length of the head. The maxillary extends nearly to the vertical from the posterior margin of the orbit. There are five series of scales between the eye and the angle of the præoperculum. The pectoral extends to the origin of the anal fin, and its length is more than one-half of that of the head; the length of the ventral is three-quarters of that of the pectoral. Body with dark cross-bands, which become irregular and more numerous below the lateral line, where they are edged with silvery; an indistinct dark streak from the eye to the scapula, edged with silvery. Lower parts without black dots. Dorsal fin anteriorly with two, posteriorly with three, anal with four blackish longitudinal lines; caudal with transverse series of brown spots; pectorals immaculate; ventrals white.

Hab. —— ?

a. Fine specimen, sixty-two lines long. Perhaps from the Mauritius. From the Collection of the Zoological Society.
b. Adult. From the Collection of the East India Company.

This species is closely allied to *O. punctatus*, but has a different coloration.

3. Ophiocephalus gachua.

Ophicephalus gachua, *Buch. Ham. Gang. Fishes,* p. 68. pl. 21. fig. 21; *Taylor in Brewster's Edinb. Journ. Sc.* 1831, v. pp. 34, 36.
—— aurantiacus, *Buch. Ham. l. c.* p. 69. pl. 23. fig. 22; *Cuv. & Val.* vii. p. 415 (? variety).
Kora-motta, *Russell,* ii. p. 49.
Ophicephalus limbatus, *Cuv. & Val.* vii. pl. 201.
—— marginatus, *Cuv. & Val.* vii. p. 411; *Bleek. Verh. Bat. Gen.* xxiii., *Labyr.* p. 14; *Jacq. Voy. Ind. Poiss.* pl. 13. fig. 2.
—— cora-mota, *Cuv. & Val.* vii. p. 414.
—— fuscus, *Cuv. & Val.* vii. p. 414.
—— montanus, *MacClell. Calc. Journ. Nat. Hist.* ii. p. 583.

D. 34–37. A. 21–23. L. lat. 45. L. transv. 3/7.

No large teeth in the jaws, several on the vomer slightly enlarged. The height of the body is contained six times in the total length, the length of the head four times and a half, the length of the caudal six times and two-thirds. The width of the interorbital space is much more than the length of the snout, and two-sevenths of that of the head. The maxillary extends to the vertical from the posterior margin of the eye. There are four series of scales between the eye and the angle of the præoperculum. The pectoral does not extend to the origin of the anal fin, and its length is two-thirds of that of the head. The length of the ventral is less than one-half of that of the pectoral. Brownish (in spirits), with indistinct cross-bars on the back. Dorsal and anal with a very narrow, caudal with a broader whitish margin; pectoral with several transverse series of brown dots, more distinct on the basal portion of the fin than towards the extremity.

Fresh waters of the East Indian Continent and Archipelago.

a–b. Fine specimens. East Indies. Presented by G. R. Waterhouse, Esq.—Types of the species.
c. Half-grown. East Indies. Presented by Dr. Horsfield.
d–e. Adult and half-grown. Dukhun. From the Collection of the East India Company.
f. Adult: stuffed. Afghanistan. From the Collection of the East India Company as *Ophiocephalus montanus*, Griff.

O. aurantiacus, Buch. Ham., may prove to be a distinct species. Although the author says that it agrees in every respect with *O. gachua* except in colour, yet the figure represents a fish with considerably larger scales. The typical specimen is not preserved in the Collection presented by Mr. Waterhouse; and, in fact, the drawing is taken from the Hardwicke Collection. The colour is yellowish, with a rosy shade on the back and an oblong rosy blotch on the gill-covers.

Var. *basalis*.

A white transverse streak across the base of the pectoral; several others behind, alternately blackish and whitish.

g–h. Adult and young. From the Collection of the East India Company.

This species has a black ocellus edged with white on the hindmost part of the dorsal fin when young.

i. Young. East Indies. Presented by G. R. Waterhouse, Esq.

4. Ophiocephalus kelaartii.

D. 31–35. A. 22. L. lat. 38. L. transv. 4/8.

Several teeth in the lower jaw and on the vomer are somewhat larger than the others. The maxillary extends to the vertical from the posterior margin of the orbit. The length of the caudal fin is one-fifth of the total.

Ceylon.

a, b, c–l. Fine specimens. Ceylon. Purchased of Mr. Cuming.

Description.—This species is allied to *O. gachua*, differing from it by its longer caudal fin. The height of the body is contained seven times in the total length, the length of the head four times. The width of the interorbital space is much more than the length of the snout, and two-sevenths of the length of the head. The cleft of the mouth is of moderate width, the maxillary extending to the vertical from the posterior margin of the orbit.

The teeth on the vomer and the palatine bones stand in a single series, and several of the former and of the lower are somewhat larger than the rest. The scales on the upper surface of the head are large, plate-like; there are five series of scales between the eye and the angle of the præoperculum. The pectoral extends to the origin of the anal fin, and its length equals the distance of the eye from the end of the operculum, and is more than twice the length of the ventral fin. Caudal somewhat pointed. Greenish-olive (in spirits), with very indistinct small darker spots; vertical fins with a whitish margin; pectorals dotted all over with greyish; ventral fins colourless.

Length sixty-six lines.

5. Ophiocephalus rhodotænia.

Bleeker, Borneo, v. p. 425.

D. 41. A. 24. L. lat. 50.

No large teeth. The height of the body is one-eighth or one-ninth of the total length, the length of the head one-fourth, the length of the caudal two-ninths. The maxillary extends to below the eye. The pectorals are much longer than the ventrals. Black-

ish-brown, with a red band running from the eye to the caudal; fins blackish; dorsal with yellowish streaks posteriorly; ventrals greenish. (*Bleek.*)
Rivers of Sambas (Borneo).

This species is founded upon a single, apparently young specimen.

6. Ophiocephalus mystax.

Bleeker, Natuurk. Tijdschr. Nederl. Ind. 1853, v. p. 188.

D. 38–39. A. 22. L. lat. 50.

Several larger teeth in the lower jaw. The height of the body is contained eight times in the total length, the length of the head four times to four times and a fourth, the length of the caudal five times and a third. The maxillary extends to behind the orbit. The length of the pectoral is two-thirds of that of the head, the length of the ventral two-fifths. Brownish-green: head with yellow spots inferiorly; a brown streak from the jaw to the interoperculum. Fins brownish: anal with red margin; ventrals yellow. (*Bl.*)
Rivers of Banka.

7. Ophiocephalus melanosoma.

Ophicephalus melasoma, *Bleeker, Borneo,* v. p. 424, and *Natuurk. Tijdschr. Nederl. Ind.* v. 1853, p. 189.

D. 40–42. A. 25–26. L. lat. 54–55. L. transv. 4/11.

Several larger teeth in the lower jaw. The height of the body is contained eight times and a half or nine times in the total length, the length of the head four times or four times and a fourth, the length of the caudal five times and two-thirds. There are nine series of scales between the orbit and the angle of the præoperculum. The maxillary extends behind the orbit. The pectorals are two-thirds of the length of the head, the ventrals two-thirds of that of the pectoral. Blackish-brown, fins black; the lower parts of the head, the belly, the ventrals, and the base of the anal whitish, with dark-brown spots.
Borneo. Banka. Nias.

a. Fine specimen: seventeen inches long. Borneo.
b. Adult: stuffed. Borneo. Purchased of Mr. Frank.

8. Ophiocephalus melanopterus.

Bleeker, Borneo, ix. p. 420.

D. 45. A. 30. L. lat. 55.

Several larger teeth on each side of the lower jaw. The height of the body is contained seven times in the total length, the length of the head five times, the length of the caudal fin five times and a half. The maxillary extends behind the orbit. Ventrals half as long as pectorals. Violet-olive, fins darker; the posterior half of the dorsal and the entire anal with oblique blue stripes; the basal half of the caudal blue-dotted. (*Bleek.*)
River Kapuas (Borneo).

9. Ophiocephalus cyanospilos.

Bleeker, Sumatra, ii. p. 256.

D. 42. A. 25. L. lat. 55.

Several large teeth in the lower jaw. The height of the body is contained eight times in the total length, the length of the head three times and three-fourths, the length of the caudal fin five times and a half. The maxillary extends to the vertical from the posterior margin of the orbit. The length of the ventral is two-thirds of that of the pectoral. Greenish-brown, the lower parts clouded with darker and dotted with blue; fins blackish, ventrals white. (*Bl.*)

Rivers of Telok betong (Sumatra).

10. Ophiocephalus striatus.

Ophiocephalus striatus, *Bl.* tab. 359; *Bl. Schn.* p. 238; *Shaw, Zool.* iv. p. 530; *Cuv. & Val.* vii. p. 417. pls. 202 & 206; *Jerdon, Madr. Journ.* xv. p. 146; *Cant. Catal.* p. 92; *Cuv. Règne Anim. Ill. Poiss.* pl. 75. fig. 2; *Bleek. Verh. Bat. Gen.* xxiii., *Labyr.* p. 13.
Ophicephalus wrahl, *Lacép.* iii. p. 552; *Buch. Ham.* pp. 60, 367. pl. 31. fig. 17; *MacClell. Calc. Journ. Nat. Hist.* ii. p. 575.
Russell, pl. 162.
Ophicephalus chena, *Buch. Ham.* pp. 62, 367.
? Ophicephalus planiceps, *Cuv. & Val.* vii. p. 424.

D. 40–45. A. 26–27. L. lat. 57. L. transv. $\frac{5-6}{12-13}$. Vert. 53–55.

Several large teeth on the side of the lower jaw, those of the palatine bones cardiform. The height of the body is contained nearly seven times in the total length, the length of the head three times and three-fourths, the length of the caudal fin six times; the width of the interorbital space is rather more than the extent of the snout, and two-ninths of the length of the head. Cleft of the mouth large, the maxillary extending behind the orbit. There are eight or ten series of scales between the orbit and the angle of the præoperculum. The pectoral does not extend to the origin of the anal fin, and its length is one-half of that of the head; the length of the ventral is three-fourths of that of the pectoral. Brownish-grey (in spirits) on the back and the sides, emitting vertical processes towards the belly, which is white. Dorsal and anal fins sometimes with oblique dark streaks; frequently some white dots on a black ground on the hindmost part of these fins.

Fresh waters of the East Indies.

a. Large specimen: stuffed. Loodianah. From Mr. Griffith's Collection.
b, *c–f*. Adult and young. Ganges. Presented by G. R. Waterhouse, Esq.
g. Many half-grown and young specimens. Bengal. From the Collection of the East India Company.
h–k. Adult and half-grown: skins. Sea of Pinang. From Dr. Cantor's Collection.
l. Adult. Madras. Presented by T. C. Jerdon, Esq.

m, *n*, *o–p*. Adult and half-grown. Ceylon.
q–r. Young. Siam. From M. Mouhot's Collection.
s–t. Adult. Java.
u. Young. Philippine Islands. Purchased of Mr. Cuming.
v–y. Adult: stuffed. East Indies.
? *z*. Adult. China. Presented by the East India Company.—The body is rather more elevated than in the southern specimens.

11. Ophiocephalus polylepis.

Bleeker, Sumatra, i. p. 578.

D. 40. A. 30. L. lat. 58.

Large teeth in the jaws, on the vomer and the palatine bones. The height of the body is contained seven times in the total length, the length of the head three times and two-thirds, the length of the caudal fin six times. There are about sixteen scales in a longitudinal series between the eye and the gill-opening. The maxillary does not extend to the vertical from the posterior margin of the eye. The pectorals are half as long as the head, but much longer than the ventral. Greenish, the lower part of the sides with about twelve oblique blackish bands; fins greenish; dorsal and anal with two black longitudinal bands or with two series of black spots; the other fins variegated with blackish. (*Bleek.*)

Rivers of Solok (West Sumatra).

12. Ophiocephalus bankanensis.

Bleeker, Natuurk. Tijdschr. Nederl. Ind. iii. p. 726, and v. p. 187.

D. 40. A. 29–30. L. lat. 60–65.

Several large teeth in the lower jaw, on the vomer and the palatine bones. The height of the body is contained seven times and a third to eight times in the total length, the length of the head four times to four times and a quarter, the length of the caudal five times and a half to six times and a half. The maxillary extends behind, and in immature specimens to, the vertical from the posterior margin of the eye. The length of the pectoral is contained once and three-fourths to once and five-sixths in that of the head, the length of the ventral twice and a half to twice and three-fourths. Greenish, clouded with darker; immature specimens with a light waving band along the side. Head and lower part of the side with black dots; opercle with a large brownish spot; vertical fins violet, black-dotted; pectorals brownish, with the rays yellow-dotted; hinder half of the ventrals brownish. (*Bl.*)

Rivers of Banka and Borneo.

13. Ophiocephalus lucius.

Ophicephalus lucius, (*Kuhl & v. Hass.*) *Cuv. & Val.* vii. p. 416; *Bleek. Verhand. Batav. Genootsch.* xxiii., *Labyr.* p. 13.

D. 39–40. A. 28–29. L. lat. 65.

Several large teeth in the lower jaw and on the palate. The height of the body is one-sixth or one-seventh of the total length, the length of the head two-sevenths. The upper profile of the snout concave; head with large scales superiorly. The cleft of the mouth extends to below the eye. Brownish above, dotted with black; lighter inferiorly, with about twelve black transverse bands; an interrupted blackish longitudinal band from the operculum to the caudal fin. Two oblique black streaks on the side of the head. Vertical fins brownish, with black spots; pectorals variegated with black.

East Indian Archipelago.

14. Ophiocephalus siamensis.

D. 42. A. 27. L. lat. 65. L. transv. 5/11.

Large teeth in the lower jaw, on the vomer and the palatine bones. The height of the body is contained six times and four-fifths in the total length, the length of the head three times and two-fifths, the length of the caudal six times. The width of the interorbital space is more than the extent of the snout, and two-ninths of the length of the head. Cleft of the mouth wide, the maxillary not extending to the vertical from the posterior margin of the eye (in old specimens it probably reaches to below that margin). There are eleven series of scales between the eye and the angle of the præoperculum; scales on the upper surface of the head of moderate size. The pectoral extends to the origin of the anal fin, and its length is less than one-half of that of the head; the ventral is not much shorter than the pectoral. Greenish-olive, with darker streaks along the series of scales; a light longitudinal band from the eye to the middle of the caudal fin; two series of alternate darker blotches, one above the light band, the other below; side of the head with three oblique brown bands; dorsal and anal fins with oblique blackish stripes; caudal with blackish spots; the lower side of the head blackish, with white spots.

Siam.

a. Fine specimen: young, forty-four lines long. Siam. From M. Mouhot's Collection.

15. Ophiocephalus obscurus.

D. 42. A. 26. L. lat. 70. L. transv. 7/14.

Several large teeth in the lower jaw; those on the vomer and the palatine bones cardiform, in narrow bands. The maxillary extends behind the orbit. Blackish; a series of large round black blotches along the side.

Hab. ——?

a–b. Presented by C. Swanzz, Esq.

Description.—The height of the body is nearly one-eighth of the total length, the length of the head nearly one-fourth; the width of the interorbital space is more than the extent of the snout, and one-fourth of the length of the head. The cleft of the mouth is wide, the maxillary extending behind the orbit. The scales on the upper surface of the head are of moderate size, those on the neck small; there are thirteen series of scales between the orbit and the angle of the præoperculum. The pectoral does not extend on to the origin of the anal, and its length is one-half of that of the head; the length of the ventral is three-quarters of that of the pectoral. Caudal rounded, its length being six times and a third in the total. Blackish, lighter below, with dark streaks along the series of scales; a series of black blotches along the side; head with two indistinct oblique dark stripes on the side; vertical fins blackish, the dorsal with oblique black spots along its base. Pectoral and ventral variegated with blackish. Chin black, with white spots.

Length seventy-seven lines.

16. **Ophiocephalus barca.**

Buch. Ham. Fishes of the Ganges, p. 67. pl. 35. fig. 20, cop. in *Cuv. & Val.* vii. p. 436.

D. 50–52. A. 35–36. L. lat. 62. L. transv. 5/11.

A row of large teeth in the lower jaw, on the vomer and the palatine bones. The height of the body is one-seventh of the total length, the length of the head one-fourth, that of the caudal one-fifth. The width of the interorbital space is much more than the extent of the snout, and two-sevenths of the length of the head. Cleft of the mouth large, the maxillary extending behind the orbit. There are nine series of scales between the orbit and the angle of the præoperculum. The pectoral does not quite extend to the origin of the anal fin, its length being more than one-half of that of the head; the length of the ventral is two-fifths of that of the pectoral. Dark violet (in spirits), dotted all over with black; the dorsal and anal fins with numerous short cross-stripes on the membrane between the rays; pectoral black-dotted, ventral violet.

Fresh waters of Bengal.

a. Adult. Calcutta. From the Collection of Messrs. von Schlagintweit.

17. **Ophiocephalus nigricans.**

Cuv. & Val. vii. p. 431.

D. 50. A. 34.

Large teeth in the lower jaw, on the vomer and the palatine bones. The height of the body is one-ninth of the total length, the length of the head two-ninths. Cleft of the mouth large. Brownish-black, with some indistinct darker cross-bands on the back; dorsal and caudal black, pectoral and anal with numerous transparent dots; ventrals greyish. (*Val.*)

East Indies.

18. **Ophiocephalus grandinosus.**

Ophicephalus grandinosus, *Cuv. & Val.* vii. p. 434. pl. 203.
—— puticola, *Richards. Ichth. Chin.* p. 252.

D. 53. A. 35.

Large teeth on each side of the lower jaw. The height of the body is one-eighth of the total length. Cleft of the mouth wide. Ventrals well developed. Brown, with indistinct darker cross-bands; vertical fins blackish, with white dots; similar dots on the sides of the body. (*Val.*)

Fresh waters of China. River Maissour.

19. **Ophiocephalus marulius.**

Buch. Ham. Fishes of the Ganges, p. 65. pl. 17. fig. 19; *Cuv. & Val.* vii. p. 432; *Taylor in Brewster's Edinb. Journ. Sc.* 1831, v. p. 36.

D. 49–55. A. 31–36. L. lat. 60. L. transv. $\frac{4-5}{12-13}$.

Several large teeth on the side of the lower jaw. The height of the body is one-seventh of the total length, the length of the head one-fourth, that of the caudal fin one-sixth. The width of the interorbital space is more than the extent of the snout, and one-fourth of the length of the head. Cleft of the mouth large, the maxillary extending behind the orbit. There are ten series of scales between the orbit and the angle of the præoperculum. The pectoral does not quite extend to the origin of the anal fin, its length being rather more than one-half of that of the head; the length of the ventral is two-thirds of that of the pectoral. Brownish-olive (in spirits), with four or five dark blotches below the lateral line; a black ocellus edged with white superiorly on the base of the caudal fin; vertical fins irregularly spotted with white. *Young* individuals with a white band, running from the orbit to the upper part of the caudal fin, terminating in the ocellus mentioned. In *very young* specimens, the white band terminates in a white spot without black in the centre.

Fresh waters of Bengal, Hindostan, and Ceylon.

a. Adult: stuffed. Loodianah. From the Collection of the East India Company.
b–c, d–h, i–k, l. Young. Bengal.
m–n. Fine specimen. Ceylon. Purchased of Mr. Cuming.
o–p. Adult: stuffed. From the Collection of the East India Company.

I observe that all the young, banded specimens have the largest number of dorsal rays (54–55), whilst the old ones without light band have only 49 or 50. This may be an accidental circumstance, which, however, deserves further investigation.

20. **Ophiocephalus pseudomarulius.**

D. 48. A. 33. L. lat. 64. L. transv. 6/14.

Several large teeth on the side of the lower jaw. The height of the body is contained five times and four-fifths in the total length, the length of the head three times and four-fifths. The width of the interorbital space is more than the extent of the snout, and one-fourth of the length of the head. Cleft of the mouth large, the maxillary extending behind the orbit. There are ten series of scales between the orbit and the angle of the præoperculum. The pectoral does not quite extend to the origin of the anal fin, its length being one-half of that of the head; the length of the ventral is nearly three-fourths of that of the pectoral. A black, white-edged ocellus superiorly on the basal portion of the caudal fin. No dark blotches are visible on the side of the single dried specimen.

East Indian continent.

a. Nine inches long: stuffed. From the Collection of the Zoological Society.

This species is allied to *O. marulius*, from which it may be readily distinguished by six longitudinal series of scales between the lateral line and the anterior portion of the dorsal fin.

21. **Ophiocephalus marulioides.**

Bleeker, Borneo, v. p. 424.

D. 45. A. 30. L. lat. 55.

Several larger teeth in the lower jaw. The height of the body is contained seven times and a half in the total length, the length of the head four times, the length of the caudal fin nearly five times. The maxillary extends scarcely behind the orbit. The pectorals are much longer than the ventrals. Blackish-green, ventrals whitish; a black ocellus edged with red superiorly on the base of the caudal fin. (*Bleek.*)

Rivers of Sambas (Borneo).

22. **Ophiocephalus pleurophthalmus.**

Ophiocephalus pleurophthalmus, *Bleek. Natuurk. Tijdschr. Nederl. Ind.* i. p. 270, and *Act. Soc. Sc. Indo-Nederl.* iii., *Sumatra*, p. 37.

—— urophthalmus, *Bleek. Sumatra,* i. p. 578.

D. 40–42. A. 29–30. L. lat. 55–57.

Large teeth in the lower jaw, on the vomer and on the palatine bones; two smaller ones on each side of the upper jaw. The height of the body is contained five or six times in the total length, the length of the head three times and a half to nearly four times, the length of the caudal fin five times and three-fifths. The maxillary extends to, or somewhat behind, the vertical from the posterior margin of the orbit. The length of the ventral is four-fifths of that of the pectoral. Olive, with five black ocelli edged with whitish along the sides, the last on the middle of the base of the caudal fin; head with two oblique brownish bands running from the eye to the interoperculum; inferior parts of the sides spotted with brown, each spot with small ocelli; dorsal and anal fins with small violet ocelli at the base.

Rivers of Bandjermassing (Borneo) and of Palembang (Sumatra).

a. Fine specimen. Borneo.

23. Ophiocephalus argus.

Cant. Ann. & Mag. Nat. Hist. 1842, ix. p. 484.

D. 49–50. A. 33. L. lat. 62. L. transv. $\frac{7-8}{17}$.

A row of large teeth in the lower jaw, on the vomer and the palatine bones. The height of the body is contained six times in the total length, the length of the head three times and a half, the length of the caudal six times and a half. In young specimens the body is somewhat lower. The width of the interorbital space is nearly equal to the extent of the snout, and one-sixth of the length of the head. Cleft of the mouth very large, the maxillary extending behind the orbit. Shields on the upper surface of the head small. There are thirteen series of scales between the orbit and the angle of the præoperculum. The pectoral does not extend to the origin of the anal fin, its length being two-fifths of that of the head; the length of the ventral fin is two-thirds of that of the pectoral. Greyish-olive (in spirits), with two series of large round brown spots edged with silvery. Similar ocellated spots on the upper surface of the head; a brown band edged with silvery from the eye to the humeral region; another, which is interrupted, from the eye to the base of the pectoral.

Fresh waters of China and Chusan.

a, b, c. Adult, half-grown, and young. Chusan. From the Collection of the East India Company.—Types of the species.
d–e, f, g, h–i, k–n. Adult, half-grown, and young. China.

24. Ophiocephalus maculatus.

Bostrychus maculatus, *Lacép.* iii. pp. 140, 143.
Ophicephalus maculatus, *Cuv. & Val.* vii. p. 437; *Richards. Ichth. Chin.* p. 251.

D. 44–45. A. 28–29. L. lat. 56. L. transv. $\frac{5-6}{14}$. Vert. 52.

A row of large teeth in the lower jaw and on the palatine bones. The height of the body is contained six times in the total length, the length of the head three times and three-quarters, the length of the caudal six times and a half. The width of the interorbital space is equal to the extent of the snout, and nearly one-sixth of the length of the head. Cleft of the mouth very large, the maxillary extending behind the orbit. Scales on the upper surface of the head small. There are twelve series of scales between the orbit and the angle of the præoperculum. The pectoral does not extend on to the origin of the anal fin, its length being two-fifths of that of the head; the length of the ventral fin is two-thirds of that of the pectoral.

Greyish-olive (in spirits), with two series of large round brown spots incompletely edged with silvery. Irregular spots on the upper surface of the head; a brown band from the eye, continued into the upper series of spots; another, which is interrupted, from the eye to the base of the pectoral.

Fresh waters of China.

This species is closely allied to *O. argus*, but may be readily distinguished by the larger scales and smaller number of fin-rays.

a, b. Adult. China. Presented by J. R. Reeves, Esq.—One of these specimens has the body lower than the others, its depth being one-eighth of the total length.
c, d, e–f. Adult, half-grown, and young. China.
g. Adult: skeleton.
h. Intestines of specimen *g*.

The stomach is an oblong cæcal cavity; there are two pyloric appendages, the length of each being two-fifths of that of the intestines; the latter make an inferior and superior curve, and are half as long as the fish. The liver has two notches, the left lobe being somewhat prolonged downwards. Gall-bladder free. The air-bladder is simple, exceedingly long, extending on between the muscles of the tail to the end of the anal fin.

Skeleton.—The skull has some resemblance to that of a *Mugil*; its upper surface is flat and smooth, the interorbital space broad; there is no occipital crest, and scarcely any on the sides. The principal frontal bones extend on to the anterior part of the orbit, where they are continued by the turbinal bones, which are well ossified and form oblique sutures with the frontals. The postfrontals are narrow, situated at the side of the principal frontals, and form a ridge projecting over the tympanic groove. Præfrontals small; a narrow portion of the ethmoid is visible between the turbinal bones. The bones of the jaws are strong, elongate; the maxillary slightly dilated posteriorly; processes of the intermaxillaries short. The head of the vomer is semicircular; palatines long; infraorbital ring complete, of moderate width; tympanic groove very large, with the bones well ossified; the limbs of the præoperculum meet at a right angle, and are of equal length. The epitympanic has a broad vertical lamella interiorly, which forms a part of the cavity accessory to the gill-cavity; the upper and lower pharyngeals are covered with cardiform teeth, and do not show any peculiarity in their form.

The system of muciferous channels is well developed, and received into the interior of the bones; very distinct pores indicate their course. One of the channels commences on the turbinal bone, and is divided into two portions, one of which runs along the infraorbital ring, the other along the frontals; a transverse branch unites the frontal portion with that of the other side. The infraorbital and frontal portions are confluent into one branch behind the orbit, running along the postfrontal and parietal to the upper end of the præoperculum. The second channel commences at the symphysis of the lower jaw, passes the tympanic, and running along the præopercular limbs meets the first channel. The united stem of both passes over the suprascapula into the muciferous system of the trunk, after having emitted a short branch towards the supraoccipital.

The scapula is longer than the suprascapula; ulna with a small ovate foramen; the radius does not extend downwards to the symphysis of the humeri, and is quite flat, so that the cavity for the pectoral muscles is very shallow; there is a broad slit between radius and humerus; carpal bones very small; the upper portion of the coracoid broad, the lower short, thin, and narrow. The pubic bones are elongate, triangular, and suspended from the symphysis of the humeri.

The *vertebral column* is composed of fifty-two short vertebræ. We cannot distinguish a caudal portion, as the abdominal cavity is continued on to nearly the end of the tail. Nearly all the vertebræ have ribs suspended from long parapophyses, and the interhæmals are not in immediate connexion with the skeleton; neurals strongly inclined backwards, rather feeble; one interneural always corresponds to one neural.

25. **Ophiocephalus micropeltes.**

Ophicephalus micropeltes, (*Kuhl & v. Hass.*) *Cuv. & Val.* vii. p. 427; *Bleek. Verhand. Batav. Genootsch.* xxiii., *Labyrinth.* p. 12.
—— serpentinus, *Cuv. & Val.* vii. p. 429; *Griff. Anim. Kingd.* x. pl. 52. fig. 3.

D. 44. A. 27. L. lat. 95. L. transv. 6/15. Vert. 53.

A series of large teeth in the lower jaw and on the palatine bones. The height of the body is contained six times in the total length, the length of the head nearly four times. The width of the interorbital space is much more than the extent of the snout, and contained three times and three-fourths in the length of the head. Cleft of the mouth large, extending behind the orbit. The scales on the upper surface of the head are small, and there are about seventeen series of scales between the orbit and the angle of the præoperculum. The ventral is not much shorter than the pectoral. Back and sides brown: two series of alternate round light spots along the side; the spots are sometimes confluent, forming a zigzag band. *Young* brown, with lighter longitudinal stripes.

Fresh waters of Siam and of the East Indian Archipelago.

a. Eighteen inches long: stuffed. Siam. From the Collection of the East India Company.—Type of *O. serpentinus*.
b. Adult: skeleton. Purchased.

Dr. v. Bleeker distinguishes another species from the present one, which he calls *O. stevensii* (Borneo, vii. p. 444), and which is said to have the body rather more elongate, its depth being one-seventh of the total length. There appears also to be a difference in the coloration of the dorsal fin, which he describes as having a broad brown longitudinal band in *O. micropeltes*, whilst it is violet in *O. stevensii* with several broad oblique lighter bands.

2. CHANNA.

Channa, *Gronov. Zoophyl.* p. 135.

Ventral fins none. Pyloric appendages none. Fine teeth in the jaws, on the vomer and the palatine bones, intermixed with larger ones in the lower jaw.

Fresh waters of Ceylon.

This genus, known to Gronow and Schneider, has not been recognized by recent authors. The typical specimen is not preserved in Gronow's Collection.

1. **Channa orientalis.**

Channa, sp., *Gronov. Zoophyl.* p. 135. tab. 9. fig. 1.
Channa orientalis, *Bl. Schn.* p. 496. tab. 90. fig. 2.
—— indica, *Gronov. Syst. ed. Gray,* p. 100.

D. 34. A. 22. L. lat. 41. L. transv. 3/8.

The height of the body is contained eight times in the total length, the length of the head four times and a third, the length of the caudal five times. The interorbital space is very slightly convex, and its width is contained thrice and two-fifths in the length of the head. Snout rather obtuse; cleft of the mouth wide, the maxillary extending behind the orbit. Several teeth in the lower jaw larger than the rest; those of the vomer and the palatine bones in a single series. The length of the pectoral equals the distance of the end of the operculum from the orbit. Dark greenish-olive, indistinctly spotted with blackish. Fins with blackish spots.

Ceylon.

a, b, c–e, f–h. Adult, half-grown, and young. Ceylon. Purchased of Mr. Cuming.

The accessory respiratory organ is very little complicated: it is a cavity, the opening of which is partly closed by a fold of the mucous membrane of the upper pharyngeal bone, by another of the upper portion of the first branchial arch, and finally by a lamelliform process of the epitympanic.

Fam. 40. TRICHONOTIDÆ.

Gobioidei, part., *Cuvier*.

Body elongate, subcylindrical, covered with cycloid scales of moderate size. Eyes directed upwards. Teeth in villiform bands. The infraorbital ring does not articulate with the præoperculum. One long dorsal fin, with articulated, not branched rays, and without a distinct spinous portion; anal long; ventrals jugular, with one spine and five rays. Gill-opening very wide, seven branchiostegals; pseudobranchiæ. No prominent papilla near the anus. Air-bladder and pyloric appendages absent. Caudal vertebræ much more numerous than those of the abdominal portion.

Carnivorous fishes, living near the shores of the East Indian Archipelago and of New Zealand.

Synopsis of the Genera.

Palatine teeth	1. TRICHONOTUS.
Palatine teeth none	2. HEMEROCOETES.

The affinities of these fishes are very obscure, and one may well doubt whether they are Acantho- or Malacopterygians, the two or three unarticulated dorsal rays of *Trichonotus* scarcely entitling them to a place among the Acanthopterygians. The structure of the ventral fin (1/5) induces me to leave them in this Order; but, then, it appears to be the better course to consider them as a separate family.

1. TRICHONOTUS.

Trichonotus, *Bl. Schn.* p. 179; *Cuv. & Val.* xii. p. 315.

Head depressed, pointed, trunk subcylindrical, tail compressed; cleft of the mouth wide, nearly horizontal, with the lower jaw longest; eyes of moderate size, directed upwards. Scales of moderate size, cycloid; lateral line continuous. One dorsal; ventrals jugular, with one spine and five rays. Gill-opening very wide, with the gill-membranes scarcely united below the throat; seven branchiostegals. Villiform teeth in the jaws, on the vomer and the palatine bones. Air-bladder and pyloric appendages none.

Coasts of Celebes and Ceram.

1. Trichonotus setigerus.

Trichonotus setigerus, *Bl. Schn.* p. 179. taf. 39; *Cuv. & Val.* xii. p. 316; *Bleek. Celeb.* v. p. 251.

—— polyophthalmus, *Bleek. Ceram.* iii. p. 243 (fem.).

B. 7. D. 47–48. A. 37–38. L. lat. 57.

Vomerine teeth in an angular band. The space between the eyes very narrow. Two or four of the anterior dorsal rays produced, more or less filiform. Greenish, with ten large brown blotches on the back; head and body with numerous red, black-edged ocelli.

Coasts of Celebes and Ceram.

2. HEMEROCOETES.

Hemerocœtes, *Cuv. & Val.* xii. p. 311.

Head depressed, pointed, trunk subcylindrical, tail slightly compressed; cleft of the mouth wide, nearly horizontal, with the upper jaw longest; eyes rather large, directed upwards. Scales of moderate size, cycloid; lateral line continuous. One dorsal; all the rays articulated, and not branched; ventrals jugular, with one spine and five rays. Gill-opening very wide, with the gill-membranes scarcely united below the throat; seven branchiostegals; pseudobranchiæ. Villiform teeth in both the jaws, on the vomer, and on the separated lower pharyngeal bones; none on the palatines. Air-bladder and pyloric appendages none.

Coasts of New Zealand.

1. Hemerocoetes acanthorhynchus.

Callionymus acanthorhynchus, *Forst. Descr. Anim. cur. Licht.* p. 117.
—— monopterygius, *Bl. Schn.* p. 41.
Hemerocœtes acanthorhynchus, *Cuv. & Val.* xii. p. 311; *Richards. App. to Dieffenbach's New Zeal.* p. 212, and *Voy. Ereb. & Terr. Fish.* p. 123. pl. 54. figs. 7–12.

D. 39–41. A. 36–37. L. lat. 47. Vert. 10/37.

Vomerine teeth in two lateral groups. The maxillary bone terminating anteriorly in a spine; the space between the eyes very narrow. Uniform reddish-olive.

Coasts of New Zealand.

a. Fine specimen. New Zealand. Presented by Prof. R. Owen.
b. Adult. Cook's Straits. Presented by Sir E. Home, Bart.
c. Adult. New Zealand. Presented by His Excellency Sir G. Grey.

Fam. 41. CEPOLIDÆ.

Tænioidei, part., *Cuvier, Müller, Owen.*
Cepoloidei, *Bleek. Enum. Spec.* p. xxvi.

Body very elongate, compressed, band-like, covered with small cycloid scales; eye lateral. Teeth of moderate size. The infraorbital bones do not articulate with the præoperculum. One dorsal, which, like the anal fin, is very long, and composed of soft rays. Ventrals thoracic, composed of one spine and five rays. No prominent papilla near the vent. Gill-opening wide, with the gill-membranes scarcely united below the throat; branchiostegals six, pseudobranchiæ and an air-bladder present; pyloric appendages in small number. Caudal vertebræ exceedingly numerous.

Temperate seas of Western Europe and of Eastern Asia; one species extending to the East Indies.

Only one genus.

1. CEPOLA*.

Cepola, *L. Syst. Nat.* i. p. 445; *Cuv. Règne Anim.*

Body very elongate, compressed, covered with very small scales. Head obtuse, with the cleft of the mouth rather wide and oblique. Eyes lateral, large. Dorsal and anal fins very long, composed of soft rays, more or less contiguous with the caudal; ventral fins thoracic, composed of one spine and five rays. Teeth moderate; palate smooth. Gill-openings wide, with the gill-membranes scarcely united below the throat; gills four; pseudobranchiæ present; branchiostegals six; air-bladder large. Pyloric appendages in small number.

Mediterranean. British coasts. Seas of China and Japan; one species extending southwards to Pinang.

1. **Cepola rubescens.**

The Band-fish.
Serpens rubescens, *Rondel.* xiv. cap. 8. p. 410; *Gesner,* p. 863; *Willughby,* p. 118.
Myrus alter, *Aldrov.* iii. c. 28. p. 367; *Jonst.* tab. 5. fig. 5.
Tænia rubra, *Willughby,* p. 117; *Ray, Syn.* p. 71.
Tænia, no. 3, *Artedi, Synon.* p. 115.
Cepola rubescens, *L. Syst. Nat.* i. p. 445; *Bl. Schn.* p. 241; *Montag. Trans. Linn. Soc.* vii. p. 291. pl. 17; *Walb. Artedi,* iii. p. 117; *Brünn. Ichth. Mass.* p. 28; *Risso, Ichth. Nice,* p. 153, and *Eur. Mérid.* iii. p. 294; *Donov. Brit. Fishes,* v. pl. 105; *Turton, Brit. Faun.* p. 94; *Yarr. Brit. Fishes,* 1st edit. i. p. 195, 2nd edit. i. p. 224, 3rd edit. ii. p. 305; *Couch, Trans. Linn. Soc.* xiv. p. 76; *Cuv. & Val.* x. p. 388. pl. 300; *Guichen. Exp. Algér. Poiss.* p. 65.

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* 1. Cepola striata, *Bl. Schn.* p. 242.—Tranquebar.

Cepola tænia, *L. Syst. Nat.* i. p. 445; *Bl.* v. p. 103. pl. 170; *Bl. Schn.* p. 241; *Lacép.* ii. p. 526; *Walb. Artedi*, iii. p. 117; *Risso, Ichth. Nice*, p. 153.

—— serpentiformis, *Lacép.* ii. p. 529.

—— longicauda, *Swains. Lardn. Cycl. Fishes*, ii. p. 399.

B. 6. D. 67–69. A. 60. C. 11. Vert. 15/54. Cæc. pylor. 8.

The length of the head is one-tenth of the total (without caudal). Præoperculum without spines. The anal fin commences in the vertical from the ninth dorsal ray; vertical fins slightly contiguous. Dorsal and anal rays articulated and branched. Scales extremely small. Reddish: a black spot hidden between the intermaxillary and maxillary.

Mediterranean. British coasts.

a, b. Adult. English coast.
c. Half-grown. South Devonshire. Presented by G. Montagu, Esq.
d. Adult. Kingsbridge. Presented by J. Couch, Esq.
e. Adult: skin. Teignmouth. From the Collection of the Zoological Society.
f–h. Adult and half-grown: skins. Great Britain.
i. Half-grown. Elba. Presented by W. C. Trevelyan, Esq.
k. Adult. Bay of Naples. Presented by S. P. Pratt, Esq., as *Cepola longicauda*, Sw.
l. Half-grown. Dalmatia.
m, n, o, p, q. Adult: in spirits.
r. Adult: skeleton. Scotland. Presented by Dr. Johnston.

Skeleton.—The skull is not distinguished by any striking peculiarity; it is short and compressed, all the single bones being well ossified. The crown of the head is slightly convex, smooth, with a feeble occipital crest posteriorly; interorbital space with a longitudinal groove and with a pair of wide pores anteriorly; turbinal bones concave, spoon-like. Maxillary elongate, triangular, much dilated posteriorly; intermaxillary with short posterior processes. The infraorbital ring is throughout of nearly equal width, rather narrow and firm. Bottom of the tympanic groove osseous. The limbs of the præoperculum are provided with a very distinct muciferous channel, and of nearly equal length; they meet at an obtuse angle. Operculum with an internal longitudinal ridge terminating in a short spine. The cavity for the pectoral muscles is rather small. Fifteen abdominal and fifty-four caudal vertebræ; vertebræ compressed; apophyses and ribs feeble.

	lines.
Length of the sixteenth vertebra	2
——— of the fiftieth vertebra	2
——— of the abdominal portion	25½
——— of the caudal portion	114

2. Cepola schlegelii.

Cepola krusensternii, *Temm. & Schleg. Faun. Japon. Poiss.* pl. 81. fig. 1, (not descr.).
—— schlegelii, *Bleek. Japan,* p. 412, and *Verhand. Batav. Genootsch.* xxvi., *Japan,* p. 110.

D. plus quam 70. A. plus quam 60.

The length of the head is one-tenth of the total (without caudal fin). Præoperculum without spines. Vertical fins contiguous. Scales extremely small (L. lat. plus quam 300). Rose-coloured: a black spot hidden between the intermaxillary and maxillary. (*Bl.*)

Coast of Japan.

3. Cepola abbreviata.

Cuv. & Val. x. p. 403; *Cant. Catal.* p. 178 *Bleek. Act. Soc. Sc. Indo-Nederl.* iii., *Sumatra,* p. 38.

D. 72–74. A. 74. C. 13. Cæc. pylor. 8.

The length of the head is one-sixth or one-seventh of the total (without caudal fin). The lower præopercular margin with five rather strong teeth. Scales very small, but distinct. The anal commences opposite the eighth dorsal ray; vertical fins contiguous. Dorsal and anal rays not branched, and indistinctly articulated. Reddish: caudal rays black.

Molucca Sea. Sea of Pinang. China.

a. Not good state.
b, c. Adult and half-grown: skins. Sea of Pinang. From Dr. Cantor's Collection.

4. Cepola krusensternii.

Cepola krusensternii, *Schleg. Faun. Japon. Poiss.* p. 130 (part., not fig.): *Bleek. Verhand. Batav. Genootsch.* xxv., *Nalez. Ichth. Jap.* p. 39, (not *Synon.*); *Natuurk. Tijdschr. Nederl. Ind.* 1854, vi. p. 411; *Verhand. Batav. Genootsch.* xxvi., *Japan,* p. 108; *Act. Soc. Sc. Indo-Nederl.* iii., *Japan,* tab. 2. fig. 1.
—— hungta, *Richards. Ichth. Chin.* p. 277.

B. 6. D. 79–89. A. 76–82. C. 14. L. lat. 150–160.

The length of the head is one-eighth or one-ninth of the total (without caudal fin). The lower præopercular margin with four or five spinous teeth. Vertical fins contiguous; dorsal and anal rays not branched, and indistinctly articulated. Red: anal fin with a brown margin.

Sea of Nagasaki.

a. Adult. Japan.

5. Cepola mesoprion.

Bleek. Verhand. Batav. Genootsch. xxvi., *Japan,* p. 109.

B. 6. D. plus quam 90. A. plus quam 90.

The length of the head is one-eleventh or one-twelfth of the total (without caudal fin). The lower præopercular margin with seven or eight large spinous teeth. Scales extremely small (L. lat. plus quam 300). Vertical fins contiguous. Rose-coloured. (*Bl.*)

Sea of Nagasaki.

6. **Cepola marginata.**

Krusenstern's Reise, taf. 60. fig. 1.
Cepola marginata, *Cuv. & Val.* x. p. 402.

Red, minutely dotted with black; a small oblong black spot on the anterior part of the dorsal fin.

Sea of Japan.

7. **Cepola limbata.**

Krusenstern's Reise, taf. 60. fig. 2.
Cepola limbata, *Cuv. & Val.* x. p. 402.

Reddish, with red spots posteriorly. An ovate black spot on the anterior part of the dorsal fin.

Sea of Japan.

Fam. 42. GOBIESOCIDÆ.

Discoboli, part., *Cuv. Règne Anim.*; *Müller, Berl. Abhandl.* 1844, p. 158.
Gobiidæ, part., *Owen, Lect. Comp. Anat.* i. p. 49.
Gobiesocioidei, part., *Bleek. Enum. Spec.* p. xxvi.

Body rather elongate, anteriorly depressed, naked. Teeth conical or compressed. A single dorsal fin on the tail, without spinous portion; anal short; ventrals widely apart from each other, with one spine hidden in the skin and four (five) rays. A large adhesive apparatus between them, the posterior portion of which is suspended on the coracoid bones, which are partly free, in the axil of the pectoral fins. Three gills or three and a half. Air-bladder absent. Intestinal tract short, wide, without pyloric appendages. Skeleton firm; vertebræ $\frac{13-14}{13-22}$.

Carnivorous fishes. Most of the species live in the seas of the temperate regions of both hemispheres; two are known to inhabit seas between the tropics.

The structure of the adhesive apparatus, by which these fishes so greatly differ from the true *Discoboli*, is described under *Sicyases sanguineus*. For anatomical details see the single species, and especially *Gobiesox cephalus*.

Synopsis of the Genera.

* *The posterior division of the adhesive disk without free anterior margin.*

Three gills and a half; gill-membranes attached to the isthmus	1. CHORISOCHISMUS, p. 490.
Three gills; gill-membranes free. Both jaws with a single series of incisors	2. SICYASES, p. 494.
Three gills; gill-membranes free. None of the jaws with incisors	3. COTYLIS, p. 497.
Three gills; gill-membranes free. Several series of teeth in the upper jaw, and incisors at least in the lower	4. GOBIESOX, p. 499.

** *The posterior portion of the adhesive disk with a free anterior margin.*

Three gills; gill-membranes free. Incisors in both jaws	5. DIPLOCREPIS, p. 506.
Three gills; gill-membranes free. Very small villiform teeth in both jaws	6. CREPIDOGASTER, p. 507.
Three gills and a half; gill-membranes free. Very small teeth in both jaws	7. TRACHELOCHISMUS, p. 509.
Three gills and a half; gill-membranes attached to the isthmus. Very small teeth in both jaws. Dorsal and anal fins with the rays well developed	8. LEPADOGASTER, p. 510.
Three gills and a half. Dorsal and anal fins without distinct rays	9. LEPTOPTERYGIUS, p. 515.

1. CHORISOCHISMUS.

Gobiesox, sp., *Cuv. Règne Anim.*
Gobiesox, *Müll. & Trosch. Hor. Ichthyol.* iii. p. 17 (not *Lacép.*).
Chorisochismus, *Bris. de Barnev. Rev. Zool.* 1846, p. 209.

Anterior part of the body very broad and depressed; skin tough, naked. Dorsal fin short, situated on the tail; ventrals widely apart from each other, composed of a rudimentary spine and four (five) rays; posterior portion of the adhesive disk without free anterior margin. Jaws with a series of large conical teeth in front, and with broad bands of small ones behind this series. Gills three and a half; pseudobranchiæ; branchiostegals five; gill-membranes attached to the isthmus.

Cape Seas.

1. Chorisochismus dentex.

Cyclopterus dentex, *Pall. Spicil.* vii. p. 6. tab. 1; *Lacép.* ii. p. 64.
Lepadogaster dentex, *Bl. Schn.* p. 2.
Gobiesox dentex, *Cuv. Règne Anim.*; *Müll. & Trosch. l. c.*
—— gyrinus, *Valenc. in Cuv. Règne Anim. Ill. Poiss.* pl. 108. fig. 1 (very bad).
—— nudus, *Bris. de Barnev. l. c.* p. 145.
Chorisochismus nudus, *Bris. de Barnev. l. c.* p. 209.

D. 10. A. 7. C. 10. V. 1/5*.

Base of the pectoral without a vertical cutaneous fold; the coracoid does not extend to the upper margin of the pectoral. Red.

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* See, on the structure of the ventral fins, p. 493.

a. Adult. Cape of Good Hope. Purchased of Mr. Frank.
b. Half-grown. Table Bay. Presented by J. L. Statham, Esq.
c. Ten inches long.
d–e. Adult and half-grown: stuffed. Cape Seas.
f. Adult male: skeleton.
g. Preparation of the internal parts.

The head and the anterior part of the body are very broad and moderately depressed; the skin is tough, naked and smooth. The head is not quite so broad as long, with the lateral profiles convergent towards the snout, which is obtuse. The nape of the neck is slightly convex, the upper surface of the head quite flat, its profile gently sloping downwards to the snout in a straight line. The greatest width of the interorbital space is not quite one-half of that of the head, or twice the horizontal diameter of the eye. The cleft of the mouth is horizontal, curved, extending to the vertical from the anterior margin of the eye. The intermaxillary is slightly protractile, and armed with an outer series of six conical teeth on each side, the inner of which is very strong and curved; the others gradually diminish in size, and the hindmost is very small. There is a triangular patch of short cardiform teeth behind the series described, and, again, a single tooth in the middle of this patch is somewhat larger than the rest. There is a velum across the toothless palate. The lower jaw is of moderate length, with a broad band of short cardiform teeth and with an outer series of larger ones; those standing in front, ten in number, are much larger than the lateral ones, although much smaller than those in the upper jaw. The lips are thick, and the lower is provided with short fringes on its middle. The eye is situated immediately below the upper profile of the head; it is of moderate size, its horizontal diameter being one-sixth of the length of the head, and two-thirds of the extent of the snout. Two nostrils, close together, opposite to the upper angle of the orbit; their margins are slightly raised. The lower angle of the opercular apparatus terminates posteriorly in an acute point, enveloped in skin and directed backwards. The gill-openings are rather narrow, the gill-membranes being united with the isthmus. There are three gills and a half; the pseudobranchiæ are formed by a series of short lamellæ.

The distance of the origin of the dorsal fin from the caudal is contained twice and a half in its distance from the snout; the first ray is much shorter than the others, and apparently without joints. Caudal subtruncated, of moderate length. The origin of the anal falls vertically below the middle of the dorsal; it terminates nearly opposite the extremity of the latter fin. The pectoral is short and broad, with the posterior margin rounded and with the base smooth; it is slightly connected with the ventral inferiorly.

The structure of the adhesive apparatus is the same as in *Sicyases* *sanguineus*; it is as broad as long, and its length is one-fourth of the entire length of the fish.

This species is uniform reddish rose-coloured, and attains to a size of ten inches.

The internal organs are very similar to those of *Gobiesox cephalus* as to structure and situation, differing however in the following points.

The liver is divided into a right and left half, joined only by a narrow bridge, as in the other species, but it is the right half which is bilobed. The omentum is reduced to a narrow fold between the liver and intestinal tract, several strips of fat being deposited in it. The kidneys commence in the uppermost part of the abdominal cavity, being rather voluminous; they become thin in the middle, and both halves are united posteriorly.

There is a very singular formation in the orbita. Lacrymal organs have never been found in the class of fishes, yet the organ which I have observed is very similar to a *saccus lacrymalis*. It is a round, blind, white sac of the size of a pea, situated below the anterior corner of the orbit, between the maxillary bone and the muscles of the cheek, communicating by a rather wide foramen with the orbital cavity. The membrane by which it is formed is contiguous with that coating the orbital cavity. It must be mentioned that the integuments of the head are stretched over the eye without becoming much thinner, and without making any orbital fold.

Skeleton.—The bones are well ossified, solid, and strong; the crown of the head is very broad, but short, without prominent ridges. The principal frontal bones are much depressed between the orbits, forming a broad quadrangular groove in which the intermaxillaries move. The præfrontal occupies its usual place. The intermaxillary has a long and comparatively slender posterior process; its dentigerous portion is short, thick, trihedral: its strong anterior teeth are replaced at certain periods by others which are developed in the anterior and exterior portion of the bone; they are not replaced by teeth growing from the inside of the jaws. The maxillary is stout, slightly dilated at its extremity, and provided with an exterior longitudinal ridge. The mandibula is rather depressed and of moderate length: there is a narrow open slit between the dentary and articulary; the latter portion has an impression in which the extremity of the maxillary is received. The vomer is broad and smooth, gradually passing into the basis cranii, which is nearly flat, without any ridges. The palatine is reduced to a small styliform bone, and the pterygoid is quite rudimentary, half the size of the palatine. Entopterygoid absent. Turbinal bones tubiform and slightly curved. Of the infraorbital bones only the præorbital is present; it is directed forwards and downwards, and dilated at its extremity. The tympanic is a strong bone, with a sharp longitudinal ridge, continued into that of the præoperculum; meso- and pre-tympanic small, the latter being received into a deep notch of the tympanic; there is a wide free space between the mesotympanic and the præoperculum. The epitympanic is large, with a strong oblique crest. The præoperculum is the largest piece of the opercular apparatus; its anterior limb is entirely covered by the tympanic, and its angular portion is much produced backwards and provided with a strong ridge; interoperculum feeble, situated at the inner side of the præoperculum; suboperculum composed of three processes, the posterior of which terminates in a hook-like spine. The basal portion of the operculum is solid; the margin thin, cartilaginous. Glossohyal rudimentary; bones of the branchial arches thin and rather feeble; basibranchials absent; pharyngeals separated, and armed with coarse cardiform teeth.

The suprascapula and the scapula are simple styliform bones; the vertical portion of the humerus is as long as the horizontal; the ulna and radius are shorter than, and very similar to, the carpal bones. The coracoid is well developed, and, as usual, composed of two pieces, the upper of which is not suspended from the humerus, but fixed by a ligament to the hinder margin of the carpal bones; it is a broad lamella dilated posteriorly into the cartilage, which is externally visible; the lower piece is narrower, and fixed to the extremity of the pubic bone of its side. The pubic bones are united by suture, and form together a heart-shaped disk, the point of which is produced backwards. The anterior portion of the disk is concave, with a bony longitudinal bridge and a feeble transverse ridge. The disk is fixed to the humeral bones by the convex portions of its anterior margin, whilst the convex portions of the lateral margins serve as base for the ventral fins*. The latter are composed of one spine, which is transformed to a broad thin and curved plate hidden below the skin, and apparently of four rays; but on closer examination we find that the hidden ray has a longitudinal groove anteriorly, in which another thinner ray lies concealed; this ray is quite free, and not joined to the pubic bone. We are not aware of another example of a similar structure in fishes.

The *vertebral column* is composed of fourteen abdominal and seventeen caudal vertebræ, the abdominal portion being rather longer than the caudal. The first vertebra is thrice as broad as long, with its three conical depressions very distinct and situated in the same horizontal line; the other vertebræ become more and more compressed posteriorly. The neural and hæmal spines are of moderate length and strength, slightly inclining backwards. The zygapophyses of the abdominal vertebræ are more developed than is usual in this Order, whilst the parapophyses are entirely absent†. The ribs, which are rather broad and horizontally directed outwards, are joined into the lateral concavity of the vertebræ, immediately below the zygapophyses. The epipleurals are not much less developed than the ribs from the extremities of which they are suspended and directed backwards. We might also consider the ribs as long and detached parapophyses, and the epipleurals as the ribs proper. The interneurals and interhæmals are very feeble.

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* The structure of the ventral disk has not yet been correctly described. Stannius, for instance (p. 91), denies the presence of the coracoid. The ventral fins have been taken for a detached portion of the pectorals, &c.

† Stannius, *l. c.* p. 34 (*Cotylis*).

	lines.
Length of the first vertebra	1½
Width of the first vertebra	5
Length of the second vertebra	2
——— of the seventh vertebra	2¼
——— of the fifteenth vertebra	2
——— of the twenty-seventh vertebra	1⅓
——— of the abdominal portion	27½
——— of the caudal portion	25½

2. SICYASES.

Sicyases, *Müll. & Trosch. Wiegm. Arch.* 1843, p. 298.
Tomicodon, pt., *Barnev. Rev. Zool.* 1846, p. 144.

Anterior part of the body very broad and depressed; skin leathery. Dorsal fin short, situated on the tail; ventrals widely apart from each other, composed of a rudimentary spine and four (five) rays; posterior portion of the adhesive disk without free anterior margin. Jaws with a single series of teeth, the anterior of which are compressed and cutting. Gills three; pseudobranchiæ rudimentary; branchiostegals five; gill-membranes united under the throat, and not attached to the isthmus.

Coast of Chile. Puerto Cabello.

1. Sicyases sanguineus.

Sicyases sanguineus, *Müll. & Trosch. Wiegm. Arch.* 1843, p. 298, and *Hor. Ichthyol.* iii. p. 19. taf. 3. fig. 1.
Gobiesox brevirostris, *Guichen. in Gay, l. c.* p. 335. lam. 9. fig. 1.

B. 5. D. 10. A. 7. C. 8.

Red.

Coasts of Chile.

a, *b*. Fine specimens. Valparaiso.
c. Large specimen: skeleton. From the Collection of the Zoological Society.

The head and the anterior part of the body are very broad and much depressed; the skin is naked, thick, leathery, rugose, with vertical folds on the side of the body. The head is as broad as long, with the lateral profiles convergent towards the snout, which is obtuse. The upper surface of the head is quite flat, and the width of the interorbital space is one-half of the greatest width of the head. The cleft of the mouth is horizontal, curved, not extending to below the eye: the lips are thick; the lower is divided into three portions by two deep grooves; each of the lateral portions has a broad thin appendage hanging downwards. The intermaxillary is very little protractile, and armed with eight or ten teeth, vertically implanted, the two outer on each side being small and conical, whilst the others are flat and cutting. There is a broad velum on the toothless palate.

The lower jaw is short, anteriorly with four horizontal cutting teeth, laterally with three small conical ones. The eye is rather small, situated immediately below the upper profile of the head. Two nostrils, close together, opposite to the upper angle of the orbit; the anterior has a short fringed tentacle. The lower angle of the opercular apparatus (suboperculum) terminates posteriorly in an acute point, enveloped in skin and directed backwards. The gill-openings are somewhat narrow, in consequence of the small degree of expansibility of the gill-covers; but the gill-membranes have the margin quite free, being united together at the throat, and not attached to the isthmus. There are only three gills; the pseudobranchiæ are quite rudimentary.

The distance of the origin of the dorsal fin from the caudal is one-half of its distance from the snout; its first ray is much shorter than the others and unarticulated; but it can with as little reason be considered as a rudiment of a spinous portion as the same ray in Cyprinoid and other Malacopterous fishes. The caudal fin is truncated and of moderate length. The anal fin is shorter than the dorsal, and situated more backwards, its origin falling in the vertical from the eighth dorsal ray. The pectoral fin is broad and short, with the posterior margin convex and with a large cutaneous fold anteriorly on its base; inferiorly it is very slightly connected with the ventral.

The *adhesive apparatus* has only an *external* similarity to the organ observed in *Cyclopterus* and *Liparis*; *its structure is typically different from it.* Whilst in those genera the ventral fins occupy the centre of the disk, forming its base, these fins are here widely apart from each other, as in *Callionymus*, forming only a portion of the periphery of the disk, which is completed by a cartilaginous expansion of the coracoid bones. I here attempt to give the following detailed description of its structure.

The whole disk is exceedingly large, subcircular, longer than broad, its length being one-third of the whole length of the fish. The central portion is formed merely by skin, which is separated from the pelvic or pubic bones by several layers of muscles. The peripheric portion is divided into an anterior and posterior part, by a deep notch behind the ventrals. The anterior peripheric portion is formed by the four ventral rays, the membrane between them, and a broad fringe which extends anteriorly from one ventral to the other; this fringe is a fold of the skin, containing on each side the rudimentary ventral spine, but no cartilage. The posterior peripheric portion is suspended on each side on the coracoid, the upper bone of which is exceedingly broad, becoming a free, moveable plate behind the pectoral. A broad cartilage is firmly attached to it. The lower bone of the coracoid is of a triangular form, and supports a very broad fold of the skin, extending from one side to the other, and containing a cartilage which runs through the whole of that fold. Fine processes of the cartilage are continued into the soft striated margin in which the disk terminates posteriorly. The surface of the disk is coated with thick epidermis, like the sole of the foot of higher animals. The epidermis is divided into many polygonal plates; there are no such plates between the roots of the ventral fins.

The intestines are not in a good state of preservation. The intestinal tract appears to be nearly straight, wide, interiorly with a great many transverse folds: I did not observe any different divisions or pyloric appendages. The kidneys are small, elongate, situated in the posterior part of the abdominal cavity; urine-bladder rather small. The ovaria are entirely separated. The vent and the porus urogenitalis are very close together, immediately behind the margin of the adhesive disk. The specimen, being a female, has no anal papilla.

Skeleton.—The skull agrees with that of *Chorisochismus* in all the essential points, but differs considerably in the form of the single bones. Its upper surface from the occiput to the anterior angles of the orbits is exceedingly broad and quite smooth. The principal frontal bones are as broad as long, without concavity between the orbits; and the processes of the intermaxillaries, the posterior extremities of which are also dilated and depressed, move over the smooth surface of the frontals. The præfrontal occupies its usual position. The intermaxillary has its lateral branch quite rudimentary, whilst its anterior, dentigerous portion is swollen, and provided exteriorly with a groove above each incisor, in which the replacing teeth are developed; its posterior processes are very long, flattened, moving below the turbinal bones, which are very broad and meet anteriorly on the middle. The maxillary is stout, of irregular form, dilated at its middle, so that its broad diameter is placed vertically to the longitudinal axis of the skull. The mandibula is very short, broad and depressed; on the inferior side of the bone are grooves in which the replacing teeth are developed: the articulary portion has a lunate notch, in which the extremity of the maxillary is received. The vomer is exceedingly broad and smooth, with the anterior margin somewhat prominent, forming a very obtuse angle. Palatine bone small, trihedral; pterygoid rudimentary; præorbital small. Tympanic large, with a very strong, sharp longitudinal ridge, which is continued into that of the præoperculum; meso- and pre-tympanic small, the latter being received into a notch of the tympanic; there is a small ovate slit between mesotympanic and præoperculum. Epitympanic rather large. The præoperculum is long, but low, with a strong ridge along its lower margin, the front part of which is covered by the tympanic, whilst the posterior portion is much produced backwards; interoperculum very feeble, situated at the inner side of the tympanic and anterior portion of the præoperculum. The operculum is as large as the præoperculum and more than twice as long as broad. The suboperculum is claw-shaped, and receives the lower extremity of the operculum in a notch. Glossohyal rudimentary; bones of the branchial arches thin and feeble; basibranchials absent*; pharyngeals small, separate, and armed with small cardiform teeth.

The structure of the humeral arch and of the pubic does not differ from that of *Chorisochismus*.

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* Stannius, Zool. Fische, p. 87.

The vertebral column is composed of fourteen abdominal and twenty-two caudal vertebræ, the abdominal portion being somewhat the shorter. The neural spines of the abdominal vertebræ are somewhat stronger and shorter than in *Chorisochismus*; otherwise there is no essential difference between the skeletons of the two genera.

	lines.
Length of the first vertebra................	2
Width of the first vertebra	4½
Length of the second vertebra..............	2
——— of the seventh vertebra	2¼
——— of the fifteenth vertebra	1⅔
——— of the twenty-seventh vertebra	1¼
——— of the abdominal portion	29
——— of the caudal portion	32

2. Sicyases fasciatus.

Peters in Monatsber. Berl. Acad. 1859, p. 412.

D. 7. A. 7.

Head and body with alternate dark-green and yellowish cross-bands. The commencement of the dorsal is before that of the anal, and its distance from the caudal equals the length of its base. (*Pet.*)

Puerto Cabello. (50 mm. long.)

3. Sicyases chilensis.

Tomicodon chilensis, *Barnev. Rev. Zool.* 1846, p. 144.
Gobiesox chilensis, *Guichen. in Gay's Chil. Zool.* ii. p. 334.

D. 7. A. 6.

Both jaws with incisors, those in the upper somewhat bent outwards, those in the lower subhorizontal; one or several canine-like teeth posteriorly on each side of the jaws. Head longer than broad. Subopercular spine very short. Dorsal and anal fins exactly opposite each other. (*Barnev.*)

Valparaiso.

3. COTYLIS.

Cotylis, pt., *Müll. & Trosch. Wiegm. Arch.* 1843, p. 297, and *Hor. Ichthyol.* iii. p. 17.

Anterior part of the body very broad and depressed; skin tough. Dorsal fin short, situated on the tail. Posterior portion of the adhesive disk without free anterior margin. Teeth of the upper jaw small, not cutting, in several series; no incisors in the lower jaw. Gills three; branchiostegals six; gill-membranes united under the throat, and not attached to the isthmus.

Red Sea. Indian Ocean.

In the greater portion of the species of the genus *Cotylis*, Müll. & Trosch., the teeth of the lower jaw are not conical and cardiform, but compressed, although narrower than in *Sicyases*; those species, therefore, agree better with *Gobiesox*, Lacép., m. *C. fimbriata* has not been examined by myself, and, therefore, I am not justified in removing it from *Cotylis*.

1. Cotylis fimbriata.

Cotylis fimbriata, *Müll. & Trosch. l. c.* p. 18.

B. 6. D. 11. A. 8–9. V. 1/4.

The upper and lower jaws with numerous small fringes. Teeth of the anterior series conical, and nearly equal in size; several other small ones behind these, in both jaws.

Red Sea. Indian Ocean.

Typical specimens in the Berlin Museum. Form of the head and body as in *Gobiesox nudus*. The diameter of the eye is one-fourth of the width of the interorbital space. The anterior nostril with a small tentacle. The point in which the opercular apparatus terminates is not moveable. Lateral line none. The dorsal is little longer than the anal.

I subjoin to this genus, for the present, the following species, known only from Steller's and Pallas's descriptions:—

a. Cyclopterus ventricosus, Pall.

Cyclopterus ventricosus, *Pall. Spicil.* vii. p. 15. t. 2; *Cuv. Règne Anim.*
Lepadogaster ventricosus, *Bl. Schn.* p. 3.

B. 4? D. 10. A. 8 vel 9.

Pallas drew up his description from the MS. left by Steller and a dried specimen preserved in the St. Petersburg Museum.

The body is smooth and soft, somewhat flat superiorly and very thick, whilst the tail is suddenly narrowed behind the vent. The head is flat and obtuse, with the cleft of the mouth directed upwards, and with the lower jaw longest, if the mouth is open. Jaws with minute, rather obtuse, unequal teeth, the interior ones being the largest in the lower jaw. Nostrils double, above the eyes. Eyes directed upwards, but on the side of the head. The gill-opening is reduced to a foramen, above the pectoral, covered by a cutaneous production of the gill-cover. Branchiostegals about four. Pectorals large, extending to below the throat, with eighteen or twenty rays. The ventral disk is said to be ovate, entire, with six distinct rays on each side, surrounded by a very broad cutaneous margin. The dorsal fin is very near the caudal,—the sixth of the rays, which are of black colour, being the longest. The anal is situated opposite the dorsal, at a considerable distance from the vent; the rays are simple, or very indistinctly bifid; the fifth is the longest. The anal papilla is nearer to the anal fin than to the ventral disk. Caudal ten-rayed, subtruncated, the rays being branched.

Steller describes the kidneys as commencing near the skull; double anteriorly, they are united into one mass posteriorly. Two ureters lead into two exceedingly large urine-bladders, which are contracted posteriorly and pass into a cloaca. When the fish is compressed, the urine spouts forth with great force.

The fish examined was more than a foot in length, but is said to attain to a much greater size. It was taken on the coast of Kamtschatka.

b. Cyclopterus stelleri, Pall.

Cyclopterus stelleri, *Pall. Zoogr. Rosso-Asiat.* iii. p. 73.

Pallas gives the following particulars from the MS. of Steller. It is, probably, the type of a distinct genus:—

Body ovate, smooth; a single series of osseous tubercles along the middle of the back to the origin of the dorsal fin. Teeth small, unequal. Branchiostegals six. Gill-opening reduced to a round foramen. The dorsal fin commences on the middle of the back and extends nearly to the origin of the caudal fin. "Pinnæ postbranchiales [coracoids?] pectoralibus aliquanto altiores; pinnæ pectorales acetabulum utrinque ambiunt." The anal terminates in the vertical from the extremity of the dorsal fin.

Peter and Paul's Harbour.

4. GOBIESOX.

Gobiesox, *Lacép.* ii. p. 595.
Cotylis, pt., *Müll. & Trosch. l. c.*
Gobiesox, Tomicodon, pt., et Sicyogaster, *Bris. de Barnev. l. c.*

Anterior part of the body very broad and depressed; skin tough. Snout very obtuse. Dorsal fin short, situated on the tail. Posterior portion of the adhesive disk without free anterior margin. Distinct incisors in the lower jaw; those of the upper jaw are in several series, and the anterior ones sometimes compressed. Gills three; pseudobranchiæ rudimentary; gill-membranes united under the throat and not attached to the isthmus.

Caribbean Sea. Western coasts of South America.

1. Gobiesox cephalus.

Gobiesox cephalus, *Lacép.* ii. p. 595; *Bris. de Barnev. l. c.* pp. 145, 210.
—— testar, *Lacép.* ii. pl. 19. fig. 1.
Lepadogaster testar, *Bl. Schn.* pp. 4 & 545.
Cotylis stannii, *Müll. & Trosch. Hor. Ichthyol.* iii. p. 18. taf. 3. fig. 3.
Gobiesox tudes, *Richards. Voy. Sulph. Fishes*, p. 103. pl. 47. fig. 1.

D. 9–10. A. 6. C. 12. P. 19–20.

A vertical fold of the skin at the base of the pectoral; the coracoid is so high as to reach to the upper margin of the pectoral. A band of short conical teeth in the upper jaw; a single series in the lower, the anterior ones being slightly compressed incisors, and small like the lateral teeth, which are conical.

Caribbean Sea.

a–e, f. Adult, half-grown, and young. From the Collection of the Zoological Society.

- *g–h*. One inch long. St. Domingo. From M. Sallé's Collection.
- *i*. Half-grown. Voyage of H.M.S. Herald.
- *k*. Adult male: skeleton. From the Collection of the Zoological Society.
- *l*. Preparation of the internal parts.

The head and the anterior part of the body are very broad and much depressed; the skin is tough, naked, and smooth. The head is nearly as broad as long, with its profile semi-elliptical, the snout being very obtuse and rounded. The upper surface of the head is quite flat, gently sloping downwards in a straight line from the nape to the snout. The greatest width of the interorbital space is one-half of that of the head, or four times the diameter of the eye. The cleft of the mouth is horizontal, curved, wide, extending to below the centre of the eye; the lips are thick, the lower being divided into five portions by four vertical grooves, the central portion being the smallest, the lateral ones the largest and hanging downwards. The upper jaw is slightly protractile, and there is a broad velum behind the teeth in both jaws. The eye is small, situated immediately below the upper profile of the head. Two nostrils, close together, opposite the upper angle of the orbit, their margins being slightly raised. The lower angle of the opercular apparatus terminates posteriorly in an obtuse moveable point enveloped in skin and directed backwards. The gill-openings are somewhat narrow in consequence of the small degree of expansibility of the gill-covers; but the gill-membranes have the margin quite free, being united together under the throat, and not attached to the isthmus. There are only three gills; the pseudobranchiæ are quite rudimentary, indicated by two or three short lamellæ.

The distance of the origin of the dorsal fin from the caudal is nearly one-third of its distance from the snout; its first ray is much shorter than the others, and apparently without articulations. The caudal rounded and of moderate length; the anal is only half as long as the dorsal, commencing below its middle and terminating in the same vertical. The pectoral is broad and short, its lower half being longer than the upper; it is slightly connected with the ventral.

The adhesive apparatus is the same as in *Sicyases sanguineus*; it is as broad as long, its length being contained three times and a half in the total. The vent and the porus urogenitalis are close together, situated midway between the margin of the ventral disk and the anal. The anal papilla is small.

The colour is brown (in spirits), whitish inferiorly. The species attains to a length of seven inches.

The *internal parts* are better preserved than I have found them in *Sicyases sanguineus*, and show some very remarkable peculiarities. The whole of the intestinal tract is very short and nearly straight; this deficiency in extent of the surface for absorption, however, is made up by the broad and numerous folds of the mucosa. The single divisions of the intestinal tract are indicated externally by slight contractions, internally by broad and prominent circular folds. The œsophagus has longitudinal and very elevated folds, some of which are continued into the stomach; the latter is short, globular, and separated from the small intestine by a thick *valvula pylori*. Pyloric appendages none. The numerous folds of the small intestine are longitudinal, or oblique, and short, whilst those of the rectum are transverse. A valvula, not so thick as that on the pylorus, at the commencement of the rectum.

The liver is large, situated on both sides of the stomach, both halves being united by a very narrow bridge over the cardia; the left half is bilobed. The gall-bladder is rather large, pear-shaped, and not attached to the liver. A very remarkable circumstance is the presence of a broad, well-developed *omentum*, in which fat is deposited as in mammals. I am not aware that it has been observed in other osseous fishes, except in a rudimentary state in very young specimens.

The kidneys are very slender and thin, situated along the whole length of the abdomen on both sides of the vertebræ; the ureters lead into the hindmost extremity of the urine-bladder, which is elongate, cuneiform. Testicles separated from each other.

Skeleton.—The form of the skull is intermediate between that of *Chorisochismus* and *Sicyases*; its crown is broad, with some slight ridges, and with a single posterior and a pair of lateral impressions. The principal frontal bones are somewhat concave anteriorly to receive the posterior intermaxillary processes; the latter are very long, flattened, and move below the turbinal bones, which are much developed, crescent-shaped, and meeting with their convexities on the middle. The intermaxillaries are flattened, with the lateral branches well developed. The maxillary is strong, of moderate length, and very irregularly shaped. The mandibula is low, of moderate length, without an open slit between the articulary and dentary bones. Vomer broad and smooth, with the anterior margin concave; palatine styliform. The base of the skull is very broad, flat, and smooth. Tympanic and opercular bones as in *Chorisochismus*; structure of the humeral arch and of the pubic as in *Chorisochismus* and *Sicyases*.

Both the abdominal and the caudal portions of the *vertebral column* are composed of thirteen vertebræ, the length of the former being to that of the latter as 1 : 0·66. There are no other essential differences from the skeletons of the genera mentioned.

	lines.
Length of the first vertebra................	2⅔
Width of the first vertebra................	4½
Length of the second vertebra..............	2⅔
——— of the seventh vertebra	2¼
——— of the fifteenth vertebra	1½
——— of the twenty-fifth vertebra	1⅓
——— of the abdominal portion............	28½
——— of the caudal portion	19

2. Gobiesox macrophthalmus.

D. 8. A. 6. C. 12. P. 22.

A short vertical fold of the skin at the lower part of the base of the pectoral; the coracoid is below the level of the upper margin of the pectoral. A very narrow band of short conical teeth in the upper jaw; a single series in the lower, the anterior ones being incisors, and small like the lateral teeth, which are conical.

Hab. —— ?

a–b. Two inches long. From Mr. Gerrard's Collection.

The head and the anterior part of the body are very broad and much depressed; the head is as broad as long, with its profile semi-elliptical, the snout being obtuse and rounded. The crown of the head is quite flat, the upper profile sloping downwards in a gently curved line from the forehead to the snout; the width of the inter-orbital space equals the diameter of the eye, which is two-ninths of the length of the head. The cleft of the mouth is horizontal, curved, of moderate width, extending behind the anterior margin of the eye. The lower angle of the opercular apparatus terminates in a slender acute spine. There are four short incisors on each side of the lower jaw; they are separated from the conical lateral teeth by a larger canine-like tooth. Gill-apparatus as in the preceding species.

The distance of the origin of the dorsal fin from the caudal is two-fifths of its distance from the snout; caudal rounded; the anal commences below the third dorsal ray and extends a little more backwards than the dorsal.

Colour uniform reddish.

3. Gobiesox nigripinnis.

Cotylis nigripinnis, *Peters in Berl. Monatsber.* 1859, p. 412.

D. 11. A. 6. P. 22.

"Nostrils, mouth, teeth, opercular spine, and fin-rays as in *Cotylis stannii* [*Gobiesox cephalus*], but dorsal fin longer. Light brown above (minutely dotted with black, if viewed by a magnifier); vertical fins black." (*Peters.*)

Puerto Cabello.

4. Gobiesox nudus.

? Cyclopterus nudus, *L. Mus. Ad. Fried.* tab. 27.
Cyclopterus double-épine, *Lacép.* ii. p. 61.
Lepadogaster nudus, *Bl. Schn.* p. 2.
Cotylis nuda, *Müll. & Trosch. l. c.* taf. 3. fig. 2; (not Chorisochismus nudus, *Barnev. l. c.* p. 209).
Sicyogaster marmoratus, *Barnev. l. c.* p. 144 (without synon.).

B. 6. D. 12. A. 7. V. 1/4. P. 20.

A vertical fold of the skin at the base of the pectoral; the coracoid is distinctly below the level of the upper margin of the pectoral. Teeth of the upper jaw cardiform; the lower jaw with very narrow, but compressed incisors, which are as short as the other teeth. Brownish, with scattered dark spots; a black blotch anteriorly on the dorsal fin.

West Indies.

a. Adult. West Indies. Museum Guilding.
b. Ten lines long. Island of Cordova. Presented by G. U. Skinner, Esq.

This species is so similar to *G. cephalus* that only the following remarks appear to be necessary. The lateral profile of the head is nearly semicircular; the head is much depressed, as long as broad, its length being two-sevenths of the total. The width of the interorbital space is somewhat less than one-half the greatest width of the head, or three times the diameter of the eye. The cleft of the mouth extends beyond the anterior margin of the eye. The distance of the origin of the dorsal from the caudal is more than one-half of its distance from the snout.

There is some confusion in the synonymy of this species. It is scarcely possible to make out which species was examined by Linné and named *Cyclopterus nudus*. Bloch and, after him, Müller and Troschel refer it to the present species, whilst Brisout de Barneville considers it identical with the *Cyclopterus dentex* of Pallas; hence the Berlin naturalists were wrong in introducing *Chorisochismus nudus*, Barnev., into the synonymy of their *Cotylis nudus*. We, of course, follow the eldest authority after Linné—Bloch. Brisout de Barneville, to whom the researches of Müller and Troschel were unknown, fell into the error of confounding the Blochian species with *Gobiesox marmoratus*, Jenyns, from Chile. The latter differs in the length of the incisors of the mandibula.

The statement of Müller and Troschel that *G. nudus* is found in the East Indies is founded on Bloch, who, however, is never to be trusted with regard to localities. There can be no doubt that the specimens in the British Museum are specifically identical with that in the Berlin Museum, and it is equally certain that the former were collected in the West Indies. Thus the instances of the occurrence of *Gobiesocidæ* in the East Indies are reduced to the isolated species of *Cotylis fimbriata*.

G. nudus does not appear to exceed a length of three inches.

5. Gobiesox pœcilophthalmus.

Gobiesox pœcilophthalmos, *Jenyns, Voy. Beagle, Fishes*, p. 141. pl. 27. fig. 2.
Cotylis pœcilophthalma, *Müll. & Trosch. l. c.* p. 19.
Tomicodon pœcilophthalmos, *Barnev. l. c.* p. 144.

B. 6. D. 7. A. 7.

Anterior teeth in both jaws incisor-like; smaller teeth behind the incisors in the upper jaw.

Galapagos Archipelago (Chatham Island).

"General form same as that of *G. marmoratus*, including the proportion of head to body. Snout equally rounded. Teeth on the whole similar, but the upper ones in front, as well as the lower, incisor-like. Eyes rather larger, closer together, less than a diameter apart*. Differs essentially from the *G. marmoratus* in the form of the opercular spine, which is much sharper as well as somewhat longer and slenderer; also in having no spine concealed in the branchial membrane: the lower part of the opercular membrane, just above the spine, is fringed with a few thread-like filaments. The number of branchial rays is the same.

"The dorsal and anal are both shorter, and appear to have only seven rays each: the anal reaches a little nearer the caudal.

"Everywhere of a uniform very pale brown or brownish white, without any markings whatever. The eyes were probably very brilliant in the living fish, the irides still showing traces of what seems to have been blue and golden-pink." (*Jen.*)

Length of the single specimen observed one inch ten lines.

6. **Gobiesox marmoratus.**

Gobiesox marmoratus, *Jen. Voy. Beagle, Fishes,* p. 140. pl. 27. fig. 1; *Guich. in Gay, Chile, Zool.* ii. p. 336.
Cotylis marmorata, *Müll. & Trosch. l. c.* p. 19.
Sicyogaster marmoratus, *Barnev. l. c.* p. 144.

B. 6. D. 13. A. 11.

Teeth strong and somewhat crowded in front, in the upper jaw bluntly conical, with minute ones behind; six subhorizontal incisors anteriorly in the lower jaw, longer than the other teeth. Eyes rather more than a diameter apart.

Coasts of Chile.

The following description is taken from the 'Zoology of the Voyage of the Beagle':—

"Head very large, broad and much depressed, with the snout rounded nearly in exact semicircle. Body compressed behind and suddenly tapering behind the pectorals. The length and breadth of the head are equal, each being one-third of the entire length, excluding caudal. Gape reaching nearly to beneath the anterior angle of the eye. Teeth strong, and somewhat crowded in front; in the upper jaw bluntly conical or slightly curved, but of irregular size, with minuter ones behind; very small at the sides of the jaw, and apparently here but in a single row. Below, the six middle teeth are incisor-like and project forwards; on each side of these are two or three similar to those in front above, then follow some minuter ones at the sides. Eyes rather more than a diameter apart. Gill-opening wide, the membrane free all round, with six rays. Opercle terminating behind in a blunt point; there is also a kind of double spine concealed in the thickness of the branchial membrane, in front of the ordinary branchial rays, the extreme end of one portion of which projects a little beyond the margin.

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* Probably smaller in larger specimens.

"The dorsal commences a little beyond the middle of the entire length, and leaves a space between it and the caudal; the rays nearly equal, except the first, which is short. The anal begins under the fourth or fifth dorsal ray, and extends a trifle further than that fin. Caudal slightly rounded.

"Back and sides light brown, reticulated with black; the reticulations have a tendency to form three or four broad fasciæ across the back. Under-parts yellowish."

Length of the specimens observed two and a half inches.

7. Gobiesox mæandricus.

Lepadogaster reticulatus, *Girard in Proc. Acad. Nat. Sc. Philad.* 1854, p. 155.

—— mæandricus, *Girard in U. S. Pacif. R. R. Exped. Fishes*, p. 130.

D. 14. A. 13. C. 12. V. 1/4.

A vertical fold of the skin at the base of the pectoral; the coracoid is so high as to reach nearly to the upper margin of the pectoral. A band of short conical teeth in the upper jaw, those of the outer series being somewhat enlarged; a series of teeth in the lower jaw, the six anterior of which are compressed, cutting, subhorizontal, longer than the others; several small teeth behind the incisors. The diameter of the eye is one-third of the width of the interorbital space.

Coasts of California.

a–d. Fine specimens. Monterey.

The general habit of this species is the same as in *G. cephalus*. The head is as broad as long, with its profile nearly semicircular, the snout being very obtuse and rounded. The upper surface of the head is quite flat, gently sloping downwards from the nape to the snout in a straight line. The greatest width of the interorbital space is contained twice and a half in the length of the head, or equal to three times the diameter of the eye. The cleft of the mouth is horizontal, curved, of moderate width, extending to the vertical from the anterior margin of the eye. The lips are thick, the lower being divided into three portions by vertical grooves; the lateral portions are broad, hanging downwards. The eye is rather small, one-seventh of the length of the head: two nostrils opposite the upper angle of the orbit; the anterior with a small bilobed tentacle. The lower angle of the opercular apparatus terminates posteriorly in an obtuse moveable point enveloped in skin and directed backwards. The gill-openings, gills, and pseudobranchiæ are the same as in *G. cephalus*.

The dorsal fin commences above the vent, and the distance of its origin from the caudal is rather more than one-half of its distance from the snout. Caudal rounded, of moderate length. The anal commences vertically below the fourth dorsal ray and terminates opposite the end of the dorsal. The pectoral is broad, of moderate length, with its margin rounded and with a broad cutaneous flap at its base: inferiorly it is slightly connected with the ventral, which, as usual, is composed of one spine, hidden in the skin, and of four rays*. The adhesive apparatus is the same as in *Sicyases sanguineus*; it is longer than broad, its length being contained three times and a half in the entire length of the fish. The vent and the porus urogenitalis are close together, situated midway between the margin of the ventral disk and the anal. The anal papilla is small.

The colour is brownish-olive, irregularly mottled with darker or reticulated with black. The largest specimen observed is four inches long. Girard found a small specimen of a *Patella* in its stomach.

This species may prove to be identical with *G. marmoratus*.

5. DIPLOCREPIS.

Anterior part of the body moderately broad and depressed; skin tough; snout somewhat pointed. Dorsal fin situated on the tail. Posterior portion of the adhesive disk with the anterior margin free. Both jaws with incisors, and other smaller teeth behind. Gills three; pseudobranchiæ rudimentary; gill-membranes united under the throat, and not attached to the isthmus.

Coasts of New Zealand.

1. Diplocrepis puniceus.

Lepidogaster puniceus, *Richards. Voy. Ereb. & Terr. Fishes*, p. 71. pl. 43. figs. 1–7.

D. 11. A. 5. C. 11. V. 1/4.

The posterior portion of the ventral disk has a free anterior margin. Rose-coloured, dotted with red on the sides.

Coasts of New Zealand.

a–b. Fine specimens. New Zealand. Presented by Captain Stokes.
c. Type of the species. New Zealand. Antarctic Expedition.

The head and the anterior part of the body are less broad and less depressed than in the other species of this family; the skin is tough, naked, with raised vertical folds on the sides. The head is not quite so broad as long, with the lateral profiles slightly curved and convergent, so as to make the snout somewhat pointed. The nape and the upper surface of the head are somewhat convex, the profile descending in a gentle curve from the occiput to the eye. The width of the interorbital space equals the diameter of the eye, which is of moderate size, and contained four times and a half in the length of the head. The snout is longer than the eye, with the upper jaw slightly overlapping the lower. The cleft of the mouth is horizontal, curved, situated on the lower side of the snout, narrow, extending to the vertical from the anterior margin of the eye. The lips are rather thick, and the lateral portion of the lower lip hanging downwards. The upper jaw has ten, the lower eight small incisors, the lateral teeth being conical; small cardiform teeth stand behind the incisors in both jaws. Two nostrils, close together, are situated opposite the angle of the orbit, in a straight line with its upper margin; the anterior is provided with a short tentacle on its posterior edge. The lower angle of the opercular apparatus terminates posteriorly in an acute point, overlapped by a skinny appendage and directed backwards. The gill-openings, gills, and pseudobranchiæ are as in *Gobiesox cephalus*.

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* The description given by Girard of the ventral disk is erroneous. This author takes the ventral fins for the lower portion of the pectorals; and some portion of the disk, "which he could not make out clearly," for the ventrals.

The dorsal fin commences somewhat behind the vertical from the vent, and the distance of its origin from the caudal is rather less than one-half of its distance from the snout. Caudal rounded, of moderate length. The anal is very short, and commences vertically below the ninth dorsal ray. The pectoral fin is broad, of moderate length, with the posterior margin rounded, and with a thick fold on the lower part of its base; the fold ascends only to the middle of the base of the fin. The coracoid is so elevated as nearly to reach the upper margin of the pectoral*.

The structure of the *adhesive apparatus* is essentially the same as in *Sicyases sanguineus*, with some peculiar modifications, however, of the posterior portion. This portion forms a complete disk by itself, having a free anterior margin. The striated part of the hinder half of the periphery is composed of three lamellæ; the anterior is the shortest, the middle is composed of small broad fringes, the posterior is the longest and striated. The hardened epidermis forms a beautiful mosaic-work of very small polygonal plates.

The vent is situated immediately behind the margin of the ventral disk, and at a great distance from the anal.

The upper parts are beautifully rose-coloured, with dark-red dots on the sides. The largest of the specimens is four inches long.

6. CREPIDOGASTER.

Anterior part of the body depressed; snout produced, much depressed. Dorsal fin situated on the tail. Posterior portion of the adhesive disk with the anterior margin free. Villiform teeth in both jaws, without incisors. Gills three; pseudobranchiæ none or rudimentary; gill-membranes united under the throat, and not attached to the isthmus.

Coasts of Australia and Van Diemen's Land.

1. Crepidogaster tasmaniensis.

B. 5. D. 10. A. 9.

Caudal fin quite free from dorsal and anal. The coracoid extends upwards somewhat beyond the middle of the base of the pectoral. Snout produced, somewhat pointed, much narrower than the head.

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* Sir J. Richardson erroneously takes the ventral fins for lower pectoral rays, and the coracoid bones for the ventral fins.

Van Diemen's Land.

a. Presented by R. Gunn, Esq.

This species has entirely the habit of a *Lepadogaster*. The length of the head is one-third of the total, and its greatest width is rather more than one-half of its own length. It is suddenly narrowed before the eyes and produced into a pointed snout, the length of which is one-third of that of the head. The least width of the interorbital space is more than the horizontal diameter of the eye. The jaws are nearly equal in length anteriorly and armed with villiform teeth, which form a broad patch in front and a single series on the side. The cleft of the mouth extends to below the anterior half of the orbit. The nostrils are situated before the upper angle of the orbit and provided with very small tentacles. I cannot detect the slightest trace of a fourth gill. Pectoral and caudal fins of moderate length, rounded. The ventrals are composed of one spine, hidden in the skin, and four rays, the outer of which is attached to the pectoral by a broad membrane. The disk between the ventrals is somewhat broader than long, that between the coracoids subcircular. The vent is situated at a great distance from the margin of the adhesive disk, near the origin of the anal fin, which commences immediately behind the vertical from the origin of the dorsal.

The colours have now disappeared; they were probably a uniform red.

	lines.
Total length	26
Length of the head	9

2. Crepidogaster spatula.

D. 6. A. 7.

Dorsal and anal fins terminating at some distance from the caudal. The coracoid extends upwards to the middle of the base of the pectoral fin. Snout very broad and long, much depressed, scarcely narrower than the posterior part of the head.

Mouth of the Swan River.

a. Dredged in three fathoms, sand. Gages Road. Presented by the Earl of Derby.

This species is at once distinguished by its very broad, long snout, which is exceedingly depressed. The posterior part of the head also is much depressed, flat, and scarcely broader than the snout. The body is elongate, subcylindrical to the origin of the dorsal fin, and compressed posteriorly. The distance of the vent from the anal is only half of that from the adhesive apparatus.

	lines.
Total length	21
Length of the head	$5\frac{1}{2}$

	lines.
Distance of the origin of the dorsal from the snout	13
Distance of the origin of the dorsal from the caudal	5

7. TRACHELOCHISMUS.

Trachelochismus, *Bris. de Barner. Rev. Zool.* 1846, p. 212.

Anterior part of the body broad and depressed; skin tough, naked. Snout depressed, produced as in *Lepadogaster.* Posterior portion of the adhesive apparatus suspended at the coracoid bones, with the anterior margin free. Jaws with a patch of small teeth in front and with a series on the sides. Incisors none. Gills three and a half; pseudobranchiæ rudimentary; branchiostegals five; gill-membranes extending from one side to the other, not attached to the isthmus.

Coasts of New Zealand and of the Feejee Islands.

1. Trachelochismus pinnulatus.

Cyclopterus pinnulatus, *Forst. Descript. Anim. ed. Lichtenst.* p. 301.
—— littoreus, *Forst. l. c.* p. 114; *Bl. Schn.* p. 199.
Lepadogaster pinnulatus, *Bl. Schn.* p. 2.
Gobiesox littoreus, *Cuv. Règne Anim.*
Trachelochismus pinnulatus, *Barner. Rev. Zool.* 1846, p. 212.

D. 8. A. 7.

Caudal free from dorsal and anal fins; nostrils with short tentacles. Snout, if viewed from above, triangular, broader than long. Carmine-red, with waving purplish and yellowish cross-streaks on the occiput; body and fins with yellowish spots.

Coasts of New Zealand.

a. Fine specimen. New Zealand. Presented by Captain Stokes.
b, c. Adult.

The body is broad and depressed anteriorly, compressed posteriorly, covered with a tough and naked skin. The length of the head is one-third of the total, and its greatest width is two-thirds of its length; its upper surface is flat, gently sloping downwards to the snout; the interorbital space is very broad, its width being twice the horizontal diameter of the eye. The snout is much depressed, broader than long, and nearly twice as long as the eye. The cleft of the mouth extends to below the anterior part of the orbit; the jaws are equal in length anteriorly, with broad lips, the upper and lower lip being dilated into a flap on each side. Both nostrils are provided with short tentacles; that of the posterior, however, is minute. The lower angle of the gill-covers is produced posteriorly into a short cutaneous flap. The peculiar characters of the gill-apparatus and of the adhesive disk have been stated in the generic diagnosis. The ventrals, composed, as usual, of four rays and one spine hidden in the skin, are connected with the pectoral by a broad membrane; the disk between them is much broader than long. The coracoids extend upwards beyond the middle of the base of the pectoral, and the disk between them is subcircular. The dorsal and anal fins are opposite each other, terminating at some distance from the caudal; the former commences behind the vertical from the vent, and the latter a little more backwards. The caudal is of moderate length and rounded.

Carmine-red, with large yellowish spots on the body and fins; waving purplish and yellowish streaks cross the occiput.

Length of the specimen described 30 lines.

Forster's description of *Cyclopterus littoreus* agrees very well with the specimens described, except the dorsal fin, which, he says, is four-rayed. This, however, is doubtless an error in writing.

I refer, for the present, a single specimen, thirteen lines long, from the Feejee Islands, to this species, as it would be hazardous to establish a second species on characters taken from an apparently immature individual. It is uniform deep purple.

a. Island of Oualan. Voyage of the 'Herald.'

8. LEPADOGASTER*.

Lepadogaster, *Gouan, Hist. Pisc.* p. 177; *Cuv. Règne Anim.*; *Müll. & Trosch. Hor. Ichthyol.* iii. p. 20.

Anterior part of the body broad and depressed. Snout much depressed, more or less prominent. Posterior portion of the adhesive disk suspended at the coracoid bones, and with the anterior margin free. Dorsal and anal fins with the rays well developed. Jaws with a patch of small teeth in front, and with one series on the sides; incisors none. Gills three and a half; pseudobranchiæ rudimentary; branchiostegals five; gill-membranes attached to the isthmus.

Mediterranean, northwards to the coasts of Scandinavia.

1. Lepadogaster gouanii.

Lepadogaster gouanii, *Bris. de Barner. Rev. Zool.* 1846, p. 280.
Small Suck-fish, *Borlase, Cornw.* p. 269. pl. 25. figs. 28, 29.
Le Barbier ou Porte-Ecuelle, *Gouan, Hist. Pisc.* tab. 1. figs. 6, 7.
Jura-Sucker, *Penn. Brit. Zool.* iii. p. 120. pl. 22; edit. 1812, iii. p. 181. pl. 25; *Couch, Linn. Trans.* xiv. p. 87.
Lepadogaster rostratus, *Bl. Schn.* p. 1.
—— gouanii, *Lacép.* i. pl. 23. figs. 3, 4, ii. p. 73; *Cuv. Règne Anim.*; *Risso, Ichth. Nice*, p. 72, and *Eur. Mérid.* iii. p. 271; *Costa, Faun. Napol. Pesc.* p. 2. tab. 23. figs. 1–3; *Cuv. Règne Anim. Ill. Poiss.* pl. 108. fig. 2.
Cyclopterus spatula, *Lacép.* ii. p. 68.

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* 1. Lepadogaster brownii, *Risso, Eur. Mérid.* iii. p. 272.—Nice.
2. —— rafinesqui, *Costa, Fauna del regno di Napoli*; *Müll. & Trosch. l. c.*—Mediterranean.
3. —— latirostris, *Costa, l. c.*; *Müll. & Trosch. l. c.*—Mediterranean.

Cyclopterus ocellatus, *Donov. Brit. Fishes,* iv. pl. 76.
—— lepadogaster, *Walb. Artedi,* vii. p. 490.
—— cornubicus, *Shaw, Zool.* v. p. 397.
Lepadogaster ciliatus, *Risso, Journ. Phys.* xci. p. 248.
—— balbis, *Risso, Ichth. Nice,* p. 73. pl. 4. fig. 9, and *Eur. Mérid.* iii. p. 274 (D. 22, A. 11); *Cuv. Règne Anim.*
—— biciliatus, *Risso, Eur. Mérid.* iii. p. 272; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 537. pl. 15. figs. 4–6.
—— cornubiensis, *Flem. Brit. Anim.* p. 189; *Yarr. Brit. Fishes,* 2nd edit. ii. p. 359, 3rd edit. ii. p. 335.
—— zebrinus, *Lowe, Proc. Zool. Soc.* vii. 1839, p. 88.
—— webbianus, *Valenc. in Webb & Berthel. Iles Canar. Poiss.* p. 85.
Skeleton:—*Rosenth. Ichthyot. Taf.* tab. 20. fig. 11 (Lepadogaster balbis).

B. 5. D. 17–18. A. 9–11. V. 1/4. Vert. 14/20.

Vertical fins continuous. Anterior nostril with a tentacle; head broad and convex behind the eyes; snout depressed, produced like the bill of a duck.

Mediterranean. Black Sea. Northwards to the British coasts.

a. Adult. South Devonshire. Museum Leach.
b–d, e. Adult. Falmouth. Presented by W. C. Cocks, Esq.
f. Adult. Polperro. Presented by J. Couch, Esq.
g–k, l, m. Adult. British specimens.
n–q. Adult. Lundy Island. Presented by S. P. Woodward, Esq.
r. Many specimens. Madeira.
s. Adult. Mediterranean. Presented by the Rev. W. Hannah.
t. Adult. South Europe. Presented by P. B. Webb, Esq.

The body is broad and depressed anteriorly, compressed posteriorly, covered with a tough naked skin; there are several vertical folds on the side of the body. The head is large, its length being contained twice and a half in the total; its breadth on its posterior portion is considerable, being nearly two-thirds of its length; its upper surface is flat, gently sloping downwards to the snout; it suddenly becomes narrower before the eyes and is produced into a long and depressed snout, the length of which is one-third of that of the head. The least width of the interorbital space is somewhat more than the horizontal diameter of the eye, which is one-eighth of the length of the head. The cleft of the mouth is straight and extends to below the centre of the eye; its posterior angle is situated on the lower side of the head; the upper jaw projects a little beyond the lower; both jaws are armed with a series of teeth, which widens to a small patch of very small teeth anteriorly; the tongue is long, narrow, and free. The nostrils are close together, situated opposite the upper angle of the orbit; the anterior is provided with a tentacle, which is sometimes as long as the eye. The gill-opening is narrow, situated before the pectoral fin, the gill-membranes being attached to the side of the neck and to the isthmus. The branchiostegals, five in number, are very thin; three gills and a half; the pseudobranchiæ are rudimentary, composed of two or three laminæ only.

The pectorals are of moderate length and rounded; there is a small fold of the skin inferiorly at their base; they are connected by a broad membrane with the ventral fin, which is composed of four rays and a rudimentary spine hidden in the skin.

The structure of the adhesive apparatus is typically the same as in *Sicyases, Gobiesox*, &c., and widely different from that of *Cyclopterus* and *Liparis.* It consists of two parts, the one being in connexion with the ventral fins, the other with the coracoid bones. Both parts are separated from each other, the coracoid portion having a free anterior margin as in *Diplocrepis puniceus.* The portion between the ventral fins, which are widely apart from each other, is broader than long, anteriorly with a free cutaneous margin, which, like the ventral rays, is coated over with small polygonal plates of callous epidermis. The disk between the coracoid bones, also, is broader than long, naked and smooth in the middle, callous round its periphery, and posteriorly with a striated slightly fringed margin. The coracoid is composed of two broad bones, the upper expanding into a broad free cartilage, which does not extend to the upper margin of the pectoral fin.

The dorsal fin commences before the vertical from the vent, and the distance of its origin from the caudal is less than one-half of its distance from the snout; it is connected with the caudal by a broad membrane, like the anal fin. The caudal fin is rounded and of moderate length. The anal commences in the vertical from the sixth dorsal ray. Vent and urogenital openings situated immediately before the anal, and at a great distance from the ventral disk.

This species varies exceedingly in its coloration. In some the colour is a purplish- or carmine-red; most of these specimens have two darker cross-bands between the posterior portion of the orbits, edged with whitish, and produced into an angle posteriorly. Others have two round dark-red spots on the side of the nape of the neck (*L. balbis*, Risso). Again, in others the ground-colour is blackish-brown, hind parts of the sides with oblique blue stripes; neck with divergent cross-streaks, and with a pair of pear-shaped spots of the same colour (*L. zebrinus,* Lowe). Others are green, with brown or blue spots and markings on the head and body (*L. biciliatus,* Risso, Nordm.). Finally, some are green with brown dots, but without blue markings (*L. gouanii*, Risso).

This species attains to a length of three inches.

As in all true *Gobiesocidæ,* the intestinal tract is short, straight, and wide, without pyloric appendages. The urine-bladder is pear-shaped, of moderate size, terminating in a long urethra.

The *skeleton* does not differ essentially from that of the other *Gobiesocidæ.* The crown of the head is flat and smooth; the frontal bones have a slight longitudinal groove for the posterior processes of the intermaxillaries; the front part of the latter is dilated, and both form a slightly concave plate similar to the bill of a duck; their descending branches are quite rudimentary. The maxillary is long, styliform, slightly curved; mandibula very long and low. The turbinal bones are narrow tubes, situated on the sides of the intermaxillary processes; infraorbital bones none. There are fourteen abdominal and twenty caudal *vertebræ*, the length of the former portion of the vertebral column being to that of the latter as 1 : 0·7. The structure of the humeral arch, the ribs, &c., are the same as in the other *Gobiesocidæ*.

2. Lepadogaster candollii.

Lepadogaster candollii, *Risso, Ichth. Nice*, p. 76, and *Eur. Mérid.* iii. p. 275; *Cuv. Règne Anim.*; *Bris. de Barnev. Rev. Zool.* 1846, p. 281.
Lepadogaster chupasangue.
—— olivaceus, *Risso, Ichth. Nice*, p. 75, and *Eur. Mérid.* iii. p. 274.
—— jussieui, *Risso, Eur. Mérid.* iii. p. 273.
—— cephalus, *Thomps. Ann. & Mag. Nat. Hist.* iii. p. 34, and *Nat. Hist. Irel.* iii. p. 214; *Yarr. Brit. Fishes*, 3rd edit. ii. p. 341.

D. 14–16. A. 8–11. V. 1/4.

Caudal fin free from dorsal and anal. Anterior nostril with an exceedingly small tentacle. Head broad and flat behind the eyes; snout broad, depressed, of moderate length.

Mediterranean, northwards to the British coasts.

a, b, c. Adult and half-grown. Mediterranean.
d. Half-grown. Falmouth. Presented by W. C. Cocks, Esq.

This species has a comparatively smaller head than *L. gouanii*, and its snout is not so narrow at its base, and less distinct from the head. The length of the head is one-third of the total, and its greatest width two-thirds of its length; its entire upper surface is quite flat, the posterior portion being very depressed, and nearly on the same level with the snout. The snout is as broad at its base as it is long, and its length is one-third of that of the head. The width of the interorbital space is at least twice the diameter of the eye, which is one-sixth of the length of the head; but in immature specimens the eye is much larger, and equals the width of the interorbital space. The cleft of the mouth is straight, and extends to below the anterior portion of the orbit, its posterior angle being situated on the lower side of the head. The jaws are nearly equal in length, and armed with a small patch of teeth anteriorly and with a single series laterally. The tongue is long, narrow, and free. The nostrils are small, close together, situated opposite the upper angle of the orbit; the anterior has a very small tentacle. The branchial apparatus is the same as in *L. gouanii*, except that the lower angle of the gill-covers is not produced posteriorly, but truncated. The pectoral and ventral fins are connected with each other by a broad membrane. The coracoids are rather small, extending upwards to half the height of the pectoral: the disk between them is subquadrangular, narrower anteriorly than posteriorly. The dorsal fin commences before the vertical from the vent, and the distance of its origin from the caudal is more than one-half of its distance from the snout; it terminates immediately before the caudal. The caudal fin is rounded and of moderate length. The anal commences in the vertical from the fifth dorsal ray and extends as far backwards as the dorsal. The vent is situated immediately before the anal, at a great distance from the ventral disk. The skin is tough, and laid in vertical folds on the side of the body. Colour uniform red.

This species attains to a length of four inches.

3. Lepadogaster wildenovii.

Lepadogaster wildenovii, *Risso, Ichthyol. Nice*, p. 75. pl. 14. fig. 10, and *Eur. Mérid.* iii. p. 276; *Cuv. Règne Anim.*

D. 18. A. 14.

Vertical fins united. Nostril without tentacle. Snout short, broad, and rounded.

Coast of Nice.

Risso gives the following description:—

Body rounded anteriorly, depressed towards the tail, greenish, minutely dotted with red and spotted with blue. Muzzle short, rounded, as broad as the head; mouth wide, with the jaws equal and armed with a single series of small widely-set teeth (?). Dorsal fin low, anal slightly elevated, pectorals large. The female is violet at the season of propagation.

4. Lepadogaster bimaculatus.

Cyclopterus bimaculatus, *Penn. Brit. Zool.* iii. p. 397. pl. 22. fig. 1; edit. 1812, iii. p. 181. pl. 25; *Donov. Brit. Fishes*, iv. pl. 78; *Walb. Artedi*, iii. p. 490; *Bl. Schn.* p. 199; *Turt. Brit. Fauna*, p. 115; *Mont. Linn. Trans.* vii. p. 293; *Lacép.* ii. p. 67.

Gobiesox bimaculatus, *Cuv. Règne Anim.*

Lepadogaster bimaculatus, *Flem. Brit. An.* p. 190; *Yarr. Brit. Fishes*, 2nd edit. ii. p. 363, 3rd edit. ii. p. 339; *Düben en Koren, Vet. Akad. Handl.* 1844, p. 109. tab. 3. fig. 7; *Barner. Rev. Zool.* 1846, p. 282; *Nilss. Skand. Faun. Fisk.* p. 241.

—— ocellatus, *Risso, Ichth. Nice*, p. 74.

—— reticulatus, *Risso, Ichth. Nice*, p. 77, and *Eur. Mérid.* iii. p. 277.

—— mirbeli, *Risso, Journ. Phys.* xci. p. 249, and *Eur. Mérid.* iii. p. 277.

—— desfontainii, *Risso, Eur. Mérid.* iii. p. 275. fig. 39 (bad).

—— lineatus, *Guichen. Explor. Sc. Algér. Poiss.* p. 110. pl. 6. fig. 3.

—— maculatus, *Guichen. l. c.* fig. 4.

—— punctatus, *Guichen. l. c.* fig. 5.

D. 5–7. A. 4–6.

The dorsal and anal fins terminate at some distance from the caudal. Anterior nostril with a minute tentacle. Head broad, depressed, with the snout broader than long.

Mediterranean. British coasts, northwards to the coasts of Scandinavia.

a. Many fine specimens. Falmouth. Presented by W. C. Cocks, Esq.
b–c. Adult. Polperro. Presented by J. Couch, Esq.
d. Adult. South Europe. Presented by R. B. Webb, Esq.
e–f, *g–h*. Adult.

This species is easily distinguished by the short dorsal and anal fins and by its comparatively short snout. The length of the head is one-fourth of the total, and its greatest width is nearly two-thirds of its length; it is flat superiorly, and the width of the interorbital space is nearly twice the diameter of the eye: in immature specimens, however, the eye is comparatively larger. The snout, if viewed from above, is triangular, and rather broader than long. The cleft of the mouth extends to below the anterior margin of the eye. The disk between the coracoids is subcircular, and the coracoids themselves are low, extending upwards to the middle of the base of the pectoral. The dorsal and anal fins are opposite each other, and commence at some distance behind the vent. The distance of the origin of the former from the caudal is about one-third of its distance from the snout. The caudal is of moderate length and rounded. Light carmine-red; sometimes with a round dark-purplish white-edged spot on each side of the belly behind the pectoral.

This species attains to a length of two inches.

It appears to vary in coloration as much as *L. gouanii*, and Brisout de Barneville considers the three fishes described by Guichenot as mere varieties of *L. bimaculatus*. *L. maculatus* is represented as brownish, with three large reddish spots on the back; *L. punctatus* is green, with reddish dots, and with three brown longitudinal stripes on the snout; *L. lineatus* is green, with a pearl-coloured longitudinal band from the eye to the caudal, emitting five cross-bars towards the back.

9. LEPTOPTERYGIUS.

Leptopterygius, *Trosch. in Wiegm. Arch.* 1860, p. 205.

Anterior part of the body rather depressed; snout obtuse, rounded, depressed. Posterior portion of the adhesive disk suspended at the coracoid bones, and with the anterior margin free. Dorsal and anal fins reduced to a narrow fold, in which the rays are either rudimentary or entirely absent. Jaws with cardiform teeth. Gills three and a half; branchiostegals four; gill-membranes attached to the isthmus.

Mediterranean.

1. **Leptopterygius piger.**

Lepadogaster piger, *Nardo in Isis,* xx. pp. 478, 483; *Bris. de Barner. Rev. Zool.* 1846, p. 282.
Gouania piger, *Bonap.*
Leptopterygius coccoi, *Trosch. l. c.* p. 207. taf. 7.

Dorsal and anal fins rudimentary, very low, contiguous with the caudal. Snout short, very obtuse; nasal tentacles short, the anterior longer than the posterior. Posterior ventral disk of moderate size, subovate, scarcely narrower than the body. Eyes small. Yellowish or brownish (in spirits), sometimes with cross-bands formed of brown dots.

Coasts of Nice, Genoa, and Messina.

Fam. 43. PSYCHROLUTIDÆ.

Body rather elongate, naked; head large. Teeth small. A single dorsal fin on the tail, without spinous portion; anal similarly developed as the dorsal; ventrals close together, thoracic, composed of a few rays. Three gills and a half; pseudobranchiæ well developed. Gill-opening of moderate width, the gill-membranes attached to the isthmus.

West coast of North America.

The new fish for which I have created this family exhibits several characters indicating its natural affinity to the *Discoboli* and *Gobiesoces*, which are Acanthopterygians as this Order is understood at present. It is impossible, however, to refer it to one of these or of the other families without giving up the chief characters on which they are founded. It agrees—

1, with the *Blenniidæ* in the structure of the ventral fins, but is distinguished by the position of these fins and by the total absence of the spinous dorsal;

2, with the *Discoboli*, and especially with *Liparis*, in the structure of the infraorbital bone, in the integuments of the body, &c., but differs from them in the dorsal and ventral fins;

3, with the *Gobiesoces* in the structure of the dorsal fin, but having no adhesive apparatus.

4. It differs from the *Batrachidæ* and *Pediculati* in the dorsal and ventral fins, in the gill-apparatus, &c.

1. PSYCHROLUTES.

Characters the same as of the family.

1. Psychrolutes paradoxus.

B. 7. D. 9. A. 9. C. 12. V. 2.

Brownish-grey, with large deep-brown blotches; caudal and pectoral fins dotted and spotted with black.

a. Gulf of Georgia (Vancouver Islands). Voyage of H.M.S. Plumper.

Description of the specimen.—This fish resembles in its general habit somewhat the genus *Liparis*. Its head is large, not quite so high as broad, its length being two-sevenths of the total. The snout is obtuse, although considerably longer than the eye, rounded, with the upper profile steeper than the lower. The cleft of the mouth is oblique, of moderate width, with the jaws equal anteriorly; a narrow band of minute teeth in the jaws; the palate appears to be smooth. The maxillary, which is widened at its posterior extremity, extends to below the middle of the eye. The nostril is situated very near to the extremity of the snout, and provided with a very short tentacle. The eye is immediately below the upper profile; its diameter is about one-seventh of the length of the head, one-half of that of the snout, and nearly one-half of the width of the interorbital space. The infraorbital emits a slender process across the cheek, which, however, does not reach to the præopercular margin. None of the opercles are armed: the operculum alone is produced into a flexible, short posterior process; the gill-opening commences above that process, and is not continuous with that of the other side, the gill-membrane being attached to the isthmus. The branchiostegals are exceedingly slender, seven in number.

The body is subcylindrical anteriorly and compressed posteriorly; its greatest depth, behind the head, is one-fifth of the total length; the skin is perfectly smooth and rather loose. The pectoral is pointed, the upper rays being the longest and extending nearly to the dorsal; the ventrals rather short, close together, situated below the middle of the base of the pectoral, and composed of two rays, the inner of which is bifid. Dorsal and anal fins opposite each other, situated far backwards on the tail, terminating at some distance from the caudal, and nearly entirely enveloped in skin. Caudal slightly rounded, of moderate length. The vent is situated about midway between the root of the ventral and the origin of the anal.

The upper parts are brownish-grey, minutely dotted with black, and with two very large deep-brown blotches of irregular size. The caudal and pectoral fins are dotted and spotted with black.

	lines.
Total length	21
Length of the head	6
Height of the body	4

Fam. 44. CENTRISCIDÆ.

Bouches en flute, part., *Cuv. Règne Anim.*
Fistularidæ, part., *Müll. Berl. Abhandl.* 1844, p. 201; *Owen, Lect. Comp. Anat.* i. p. 49.
Amphisileoidei et Centriscoidei, *Bleek. Enum.* pp. xv & xxiii.

Form of the body compressed, oblong or elevated; the anterior bones of the skull are much produced, and form a long tube terminating in a narrow mouth. Teeth none. Body either covered with a cuirass or with non-confluent ossifications; scales none, or small. Two dorsal fins: the spinous short, and with one of the spines strong; the soft and the anal of moderate extent: ventral fins small, without spine, or rudimentary, abdominal. Branchiostegals three or four; air-bladder large, four gills and pseudobranchiæ. Pyloric appendages none; intestinal tract rather short. Vertebræ in small number.

Mediterranean and north-eastern shores of the Atlantic. Eastern coasts of Africa. Coasts of China, Japan, and Australia.

Synopsis of the Genera.

Body scaly or covered with prickles	1. CENTRISCUS, p. 518.
Body without any scales, with a bony cuirass...	2. AMPHISILE, p. 524.

1. CENTRISCUS.

Centriscus, sp., *L. Syst. Nat.* i. p. 415.
Centriscus, *Cuv. Règne Anim.*

Body oblong or elevated, compressed, covered with small rough scales; lateral line none; some bony strips on the side of the back and on the margin of the thorax and abdomen; the former, in one species, are confluent and form a shield. Teeth none. Two dorsal fins, the first with one of the spines very strong. Ventral fins small, abdominal, composed of five soft rays. Four branchiostegals; gill-opening wide, four gills and pseudobranchiæ; air-bladder large; pyloric appendages none.

From the coast of England to the west coast of Africa; Mediterranean. Seas of Japan and Australia. (Amboyna?)

This genus shows a remarkable similarity to *Zeus* and *Cyttus* with regard to its geographical distribution.

1. Centriscus scolopax.

The Trumpet-fish. The Bellows-fish.
Scolopax, *Rondel. De Pisc.* xv. cap. 5. p. 422; *Aldrov.* iii. c. 13. p. 298; *Jonst.* i. tit. 1. cap. 1. art. 4. tab. 1. fig. 9.
Trumpet-fish, *Willughby*, p. 160. tab. 1. 25. fig. 2; *Ray, Syn.* p. 50; *Couch in Linn. Trans.* xiv. p. 89.

Centriscus scolopax, *L. Syst. Nat.* i. p. 415; *Brünn. Pisc. Mass.* p. 8; *Bl.* i. p. 55. taf. 123. fig. 1; *Bl. Schn.* p. 112; *Lacép.* ii. pp. 86, 95, i. pl. 19. fig. 3; *Donov. Brit. Fishes,* iii. pl. 63; *Turton, Brit. Faun.* p. 117; *Shaw, Nat. Misc.* xiv. pl. 584, and *Zool.* v. p. 459. pl. 181; *Flem. Brit. Anim.* p. 220; *Cuv. Règne Anim.*; *Jenyns, Man.* p. 400; *Yarr. Brit. Fishes,* i. p. 302, 2nd edit. i. p. 346, 3rd edit. ii. p. 190; *Guérin, Iconogr. Poiss.* pl. 45. fig. 2; *Martens, Reise nach Venedig,* ii. p. 436; *Gronov. Syst. ed. Gray,* p. 138.
Solenostomus, no. 1, *Klein, Miss. Pisc.* iv. p. 24.
Silurus cornutus, *Forsk.* p. 66.
Centriscus, sp., *Gronov. Zoophyl.* no. 395.
Macrorhamphosus cornutus, *Lacép.* v. pp. 136, 137.
Snipe-nosed Trumpet-fish, *Penn. Brit. Zool.* edit. 1812, iii. p. 190.
Solenostomus scolopax, *Risso, Ichth. Nice.* p. 80.
Skeleton: *Rosenthal, Ichthyot. Taf.* tab. 10. figs. 11, 12; (incorrect: copied by *Yarrell*).

B. 4. D. 5 | 12. A. 20. P. 16. V. 5. C. 6+4+5+7.
Vert. 8/16.

The height of the body is contained once and three-fourths to twice and one-third in the distance of the operculum from the base of the caudal. The second dorsal spine is very strong, and serrated posteriorly, its length being contained once and two-thirds to twice and two-thirds in the distance of the opercle from the caudal.

This species appears to be peculiar to the Mediterranean and to the neighbouring parts of the Atlantic; it extends northwards to the south coast of England.

a–b. Fine specimens. Adriatic.
c. Adult.
d–g. Adult: bad state. From the Haslar Collection.
h–n. Young. From the Haslar Collection.
o, p, q, r. Adult and half-grown: stuffed.

Description.—The length of the head equals its distance from the caudal fin; it is produced into a long compressed tube, terminating in a very small mouth; it is rather elevated posteriorly, and strongly compressed like the body. The cleft of the mouth is slightly oblique, with the extremity of the lower jaw somewhat prominent. The jaw-bones are very short, the intermaxillary feeble and styliform, the maxillary broad and triangular. There are no teeth whatever.

The eye is large, equal in width to the extent of the part of the head behind it; the skin of the head passes over it as in all fishes, and that part which covers the posterior half of the iris is provided with small ctenoid scales; the margins of the orbit are minutely crenulated; the interorbital space is smooth, slightly convex, and equal in width to one-half of the diameter of the eye. The nostrils are close together, situated one before the other, on the side of the head, at a small distance from the orbit. The præoperculum has the posterior margin obliquely descending forward, partly confluent with the orbit, and minutely denticulated; its angle is somewhat produced backwards; the whole space between præoperculum, orbit and nostrils is scaly. The interoperculum is extremely narrow and elongate. Operculum higher than long, obtusely rounded; suboperculum subcrescentic. Four slender branchiostegals. The gill-opening extends to below the eye, the gill-membranes being attached to the urohyal: the glossohyal is long, feeble, gradually lost in the membrane which forms the bottom of the rostral tube. Four gills, with a narrow slit behind the fourth; pseudobranchiæ well developed.

The body is strongly compressed and more or less elevated; its greatest depth is between the ventral and dorsal fins, where it is contained once and three-fourths to twice and one-third in the distance of the operculum from the caudal fin. Its upper profile gradually ascends towards the spinous dorsal, is nearly horizontal between the origins of the two dorsal fins, descending abruptly along the base of the second dorsal, and shelving towards the caudal. The lower profile is a slight, regular curve. The whole body is covered with small scales, which are striated, each stria terminating in a comparatively strong spine.

Several bony strips are visible on the side of the back: one arises from the side of the nape and proceeds towards the first dorsal spine, where it meets its fellow of the other side. Another strip commences from the scapulary region and represents a sort of lateral line; it is composed of three bones, each bone having a horizontal and an oblique portion, which cross each other. The margins of the thorax and of the abdomen are covered with several bony plates which have a cutting longitudinal ridge along the middle.

The pectoral fins have a short and oblique base, and are inserted below the middle of the depth of the body; they equal in length the distance of the anterior margin of the orbit from the posterior of the operculum, and extend to above the middle of the ventral fins; the rays of which they are composed are simple. The ventral fins stand as close together as in a Gobioid, and are received in one common groove on the belly; they are very short, apparently without spine, and composed of five rays, the middle of which are split nearly to the base.

The first dorsal fin commences in the middle of the distance between the occiput and the caudal fin; it is composed of five spines, the first of which is very short, moveable, the three posterior being much longer than the first, though rather feeble; they are connected with the second spine by a strong membrane. The second spine is exceedingly strong and long, compressed, striated, grooved posteriorly, and strongly serrated; it cannot be erected in a vertical line, but always remains obliquely pointing upwards and backwards; its length appears to vary in different individuals:—

In a	specimen	78	lines long it is	13½	lines long.
„	„	57	„ „	16	„
„	„	50	„ „	13	„
„	„	46½	„ „	8½	„
„	„	44	„ „	12	„
„	„	8	„ „	1½	„

The soft dorsal fin is higher than long, with the rays simple, the middle ones being the longest; its distance from the caudal equals the length of its base. The anal fin commences immediately behind the vent, vertically below the fourth dorsal spine, and extends a little more backwards than the soft dorsal; it is, like that fin, composed of simple rays, but much lower. The caudal fin is shorter than the pectoral, slightly emarginate posteriorly, and composed of nine rather compressed and undivided rays, the others on the upper and lower sides of its base being rudimentary.

The colour of the specimens is rose or reddish-olive on the back, and silvery on the sides and on the belly.

The *vertebral column* is composed of eight abdominal and sixteen caudal vertebræ; the former are distinguished by their strength and large size, a peculiarity which is in intimate connexion with the circumstance that they form the base of other strongly developed bones; their parapophyses are strong, rather long, and those of the first four vertebræ have their extremities united. The bony strips, which are visible externally, and which we have mentioned in the description of the outward characters, are the modified ribs with their epipleurals. The neural spines of the three anterior vertebræ are strong, especially that of the third, which corresponds to the interneural of the second dorsal spine. This interneural is situated behind the third neural, and ends in three articular processes which receive two others of the dorsal spine between them.

Another peculiarity is the great breadth of the radius, this bone forming with its fellow a suture which is as long as the bone is high; there is an oval free space between the radius and the humerus. The coracoid is very strong, straight, sabre-shaped, extending backwards to the pubic bones, which, however, are not fixed to it and quite small. The bony plates forming the cutting margin of the abdomen and thorax are dermal productions, and do not belong to the skeleton.

2. Centriscus gracilis.

Lowe, Proc. Zool. Soc. 1839, p. 86, and *Trans. Zool. Soc.* iii. p. 12.

B. 4. D. 4–5 | 11. A. 18–19. P. 16. V. 5. C. 6+4+5+6.

The height of the body is contained twice and three-fifths to three times in the distance of the operculum from the base of the caudal fin. The second dorsal spine is rather strong, not (or very indistinctly) denticulated posteriorly, its length being one-fourth or two-ninths of the distance of the opercle from the caudal.

Sea of Madeira. West coast of Africa. Coasts of Japan and China.

a–c. Half-grown. Mediterranean. Purchased of Mr. Frank.
d. Adult. ? Mediterranean. Purchased of Mr. Jamrach.
e. Adult. Madeira. Presented by the Rev. H. H. Methuen.
f, g. Fine specimens. Sierra Leone.
h, i. Fine specimens. Japan.

k–n. Half-grown. China Seas. Presented by Vice-Admiral Sir E. Belcher, C.B.
o. Adult.
p, q. Adult: stuffed.

Description.—This species does not differ in any essential point from *C. scolopax*, so that we can dispense with a lengthened description; it will be readily distinguished by its body, which is more elongate than in the other species, by its much shorter spine, and, finally, by conspicuously smaller scales, which advance nearly to the middle of the length of the rostral tube.

The length of the head is somewhat less than its distance from the caudal fin; the skin which covers the iris is scaly nearly in its entire circuit; the margins of the orbit are smooth. The upper and lower profiles of the body are very little convex. The spinous dorsal fin commences much nearer to the occiput than to the base of the caudal fin; the length of its second dorsal spine varies a little in different individuals:—

In a specimen	60	lines long	(Japan)	it is	6½	lines long.
,, ,,	57	,,	(?Mediterranean)	,,	7	,,
,, ,,	52	,,	(Japan)	,,	5½	,,
,, ,,	41	,,	(Sierra Leone)..	,,	5½	,,
,, ,,	39	,,	(Sierra Leone)..	,,	5½	,,
,, ,,	41	,,	(Madeira)	,,	5½	,,
,, ,,	36	,,	....	,,	4⅓	,,
,, ,,	23	,,	(Mediterranean)	,,	3⅓	,,
,, ,,	18	,,	(Mediterranean)	,,	2½	,,
,, ,,	17	,,	(China)	,,	2½	,,

The distance of the soft dorsal fin from the caudal is more than the length of its base. The anal commences immediately behind the vent, or behind the vertical from the fourth dorsal spine. Caudal emarginate. Back reddish or greenish, sides and belly silvery.

These characters will sufficiently prove the distinctness of this species from *C. scolopax*. Its occurrence in the Atlantic and in the Japanese seas is a new proof of the similarity of a part of the fauna of the latter to that of Southern Europe. The specimens from both seas are so similar, that we consider them as one and the same species; as, however, there exists a trifling difference in the length of the dorsal spine, it being a little shorter in the Japanese specimens, this character will be taken advantage of to separate them specifically. We propose, to those who are inclined to do so, the name of *Centriscus japonicus*.

3. Centriscus humerosus.

Richards. Voy. Ereb. & Terr. Fishes, p. 56. pl. 34. figs. 5, 6.

D. 7 | 15. A. 17. C. 4+4+5+5.

The height of the body is somewhat less than the distance of the operculum from the base of the caudal. The second dorsal spine is exceedingly strong and long, its length being a little more than one-half the distance of the opercle from the caudal.

Australian Seas.

a. Adult: stuffed. Australia.—Type of the species.

Description.—The length of the head is somewhat less than its distance from the caudal fin; it is rather elevated posteriorly and compressed into a sharp ridge above. The eye is large, equal in width to the extent of the part of the head behind it; the skin which covers the iris is scaly; margin of the orbit smooth. The nostrils are close together, situated one before the other, on the side of the head, at a small distance from the orbit. The limbs of the præoperculum meet at a right angle; the posterior descends obliquely forward, is partly confluent with the orbit, and very indistinctly denticulated. The scales advance very far on the rostral tube.

The body is strongly compressed and much elevated; its greatest depth is above the ventrals, where it is somewhat less than the distance of the operculum from the caudal fin. Its upper profile makes a hump on the neck, and then ascends gradually to the base of the second dorsal spine, where it descends abruptly in a nearly vertical line to the free portion of the tail. The lower profile is semicircular between the throat and the end of the anal fin. The whole body is covered with very small scales, each of which terminates in a spine posteriorly. There are two series of bony plates on the side of the back, each series being composed of four plates which have a centre with horizontal and vertical stripes radiating from it; the lower series commences in the scapulary region, the upper runs in a parallel line above it. The margin of the thorax is cuirassed with three series of similar plates, that of the belly with a single series; the edge of the thorax and that of the belly are sharp.

The pectoral fins have a short and oblique base, and are inserted on the middle of the depth of the body; they are rather longer than the distance of the anterior margin of the orbit from the posterior of the operculum, and extend to above the middle of the ventral fins. Ventral fins very small. The distance of the very small first dorsal spine from the caudal fin is two-thirds of that from the occiput; the second spine is exceedingly strong and long, compressed, striated, and strongly denticulated posteriorly; the other spines behind it are short. The soft dorsal fin is higher than long, and its distance from the base of the caudal is more than the extent of its base. The anal fin commences immediately behind the vent in the vertical from the last dorsal spine, and extends a little more backwards than the soft dorsal; it is, like that fin, composed of simple rays, but much lower. (The caudal fin is mutilated.)

	inches.	lines.
Total length	5	6
Length of the head	2	3
——— of the snout (from the orbit)	1	7
Height of the body	2	1
Length of the second dorsal spine	1	4

4. Centriscus velitaris.

Centriscus velitaris, *Pall. Spicil. Zool.* viii. p. 36. pl. 4. fig. 8; *Bl. Schn.* p. 113.
—— sumpit, *Lacép.* ii. p. 93.
Amphisile velitaris, *Cuv. Règne Anim.*

We extract the following notes from Pallas's description:—

"D. 2 | 12 (?). A. 25.

"Pisciculus bipollicaris, plano-compressus, oblongo-lanceolatus, ventre in aciem compresso, ante pinnes ventrales triquetro-carinato; totus quasi setulis recumbentibus et adnatis hispidus. Dorsum anticum duriusculum, scuto rhombico ad aculeum dorsalem terminato, et quasi loricato lineolis obliquis, circiter quaternis. Spina in medio dorso recumbens, minus quam aculeus nuchæ in Balistis, mobilis; subulata acutissima, subtus canaliculata, aciebus serrulatis. Sub eaque spina parvula, in fossulam dorsalem reponenda, priori et dorso ad basin membranula adnexa. Pinna dorsi pone spinæ apicem exilis, radiorum circiter duodecim. Pinnæ pectorales parvæ teneræ, radiorum circiter tredecim; pinnæ ventrales in medio corporis ad imam ventris carinam, fossulæ recondendæ, tri- vel quadri-radiatæ. Pinna ani lata, viginti quinque radiorum. Anus proxime ad pinnam, ad secundam tertiam partem longitudinis totius corporis. Aculeus minutus ante anum recumbens. Cauda teretiuscula; pinna subbifurca, radiorum perfectorum duodecim. Color totius argentatus, in dorso griseo-flavescens.

	pollices.	lineæ.
Longitudo tota	2	5
——— rostri usque ad orbitæ marginem	0	6¾
——— totius capitis	0	11½
——— ad ortum spinæ	1	5
——— ad pinnas ventrales	1	3
——— ad anum	1	6½
Distantia pinnæ dorsalis et ani a pinna caudæ	0	4
Latitudo pinnæ ani	0	5
——— summa corporis verticalis	0	5½

"Est hic levis armaturæ miles, quem Ichthyologico exercitui Amboyna pariter misit."

We very much doubt whether this fish came from the East Indian Archipelago, as asserted by Pallas; it has not yet been recognized; it appears to have more affinities towards *Centriscus* than to *Amphisile*, having the skin covered with prickles, a moveable and serrated dorsal spine on the back, a groove on the belly for the reception of the ventral fins, &c.

2. AMPHISILE.

Amphisile, sp., *Klein, Miss. Pisc.* iv. p. 28.
Amphisile, *Cuv. Règne Anim.*

Body elongate, strongly compressed, provided with a dorsal cuirass which is formed by portions of the skeleton; the longitudinal axis of the tail is not in the same line with that of the trunk. Scales none. Teeth none. Two dorsal fins situated on the hindmost part of the back; ventral fins rudimentary, abdominal. Three or four branchiostegals; gill-opening of moderate width, four gills and pseudobranchiæ; air-bladder large; pyloric appendages none.

From the eastern coasts of Africa to the seas of China.

1. **Amphisile scutata.**

Valent. Amb. iii. p. 420. figs. 243 & 254; *Seba,* iii. p. 107. tab. 34. fig. 5; *Ruysch. Coll. Amb.* tab. 3. no. 7.
Centriscus scutatus, *L. Syst. Nat.* i. p. 415; *Bl.* i. p. 57. taf. 123. fig. 2; *Bl. Schn.* p. 113; *Lacép.* ii. p. 88, i. pl. 19. fig. 2; *Shaw, Zool.* v. p. 458. pl. 181.
Centriscus, sp., *Gronov. Zoophyl.* no. 396. tab. 7. fig. 3.
Amphisile scutata, *Cuv. Règne Anim.*; *Guér. Iconogr. Poiss.* pl. 45. fig. 3.
Centriscus scutatus, *Gronov. Syst. ed. Gray,* p. 138.

B. 3. D. 3 | 10–12. A. 12. C. 10. P. 10. V. 3. Vert. 6/14.

The dorsal cuirass terminates in a long spine, to which no separate dorsal spine is joined; the distance of the posterior margin of the operculum from the pectoral fin is twice its distance from the eye. Body immaculate.

East Indian and Chinese Seas.

a. Adult. Singapore.
b. Adult. Philippine Islands. Purchased of Mr. Cuming.
c–i. Adult: dried. China.
k. Half-grown. From the Haslar Collection.

Description.—The body of this singular fish is so thin, that it has the appearance as if it had been artificially compressed between two sheets of paper; the diameter at its thickest part is scarcely more than the width of the orbit. It is rather elongate, tapering into the long compressed rostral tube anteriorly and terminating in a long spine posteriorly. The greater portion of the body is transparent, especially the rostral tube, the place occupied by the air-bladder, and the broad membranaceous margin of the lower parts. The whole head and back are cuirassed with smooth bony plates, whilst the abdomen is covered with a very tough skin; and only the small portion of the tail which projects below the end of the dorsal plates is naked, soft, moveable, and the only organ of locomotion in these fishes.

The head is so joined to the trunk by a transverse suture between the occiput and the first dorsal plate, that only a limited vertical and horizontal motion is possible. The mouth is extremely small and toothless. The eye is of moderate size, the length of its diameter being one-half of the extent of the head behind it. The crown of the head is much compressed, minutely striated and crenulated, and with a longitudinal groove extending to between the orbits; the width of the interorbital space is rather less than that of the orbit. The rostral tube is compressed into a cutting edge superiorly. The nostrils are minute openings, very close together, situated one before the other, on the side of the head and at a small distance from the orbit. The operculum is ovate, nearly twice as long as high; the suboperculum broad anteriorly, curved and tapering posteriorly; the præ- and inter-operculum are united into one bone, the inferior portion of which is extremely thin, transparent and flexible, forming a broad membranaceous margin at the throat, which is continued by that of the belly.

Branchiostegals three, extremely feeble; four gills, pseudobranchiæ well developed; gill-opening of moderate width.

The back of the fish is cuirassed by a bony sheath, which extends downwards nearly to the middle of the side, has a shallow notch before and above the pectoral fin, and tapers behind into a point projecting beyond the end of the tail. It is composed of five median pairs of narrow bones, six lateral ones of a lamelliform shape, and, finally, of a single long dagger-shaped bone which terminates the cuirass. The sutures of all these bones are deeply serrated, except the longitudinal suture along the vertebral line, which is simple. The long moveable spine in which the cuirass terminates is evidently an interneural, since, in the second species, the first spine of the dorsal fin is joined to it; it is situated in quite a horizontal direction, in the same line as the upper profile of the body.

The humerus also contributes to the bony covering of the body: a long horizontal portion of it extends from the operculum to the base of the pectoral fin; it fits into the shallow notch of the dorsal cuirass mentioned, and is of a lanceolate shape, tapering into a point posteriorly.

The inferior half of the side of the trunk is covered by a transparent tough covering, which passes into a broad cutting fringe inferiorly; this fringe extends the whole length of the abdomen, and the whole covering is supported by the coracoid and by seven or eight ribs.

The vertical fins are crowded together on the short and elevated tail: this part is covered with soft skin, moveable, propelling the body through the water by its lateral motion; its length, from the point where it is free to the base of the caudal fin, is less than the depth of the body. As the cuirass has a horizontal direction, the tail is, as it were, obliquely pressed downwards. Three slender dorsal spines are situated below, and nearly parallel to, the interneural; they are connected with the interneural and with one another by a tough membrane. The second or soft dorsal fin is immediately behind the first, and composed of ten or twelve simple rays, the posterior of which are quite rudimentary and point obliquely downwards. The caudal fin is obtusely rounded, directed downwards, and has also simple rays; the anal fin has not an unusual position, and terminates, like the dorsal, closely before the caudal. The pectoral is obliquely truncated, inserted upon the middle of the depth of the body, at a considerable distance from the head, as stated above. The ventral fins are rudimentary, apparently composed of three rays; they are inserted upon the cutting edge of the membranaceous fringe of the abdomen, below the third rib, at a distance from the root of the pectoral fin which equals that between the operculum and the pectoral; a rudimentary pubic bone is visible within the fringe*.

The vent is situated very far backwards, immediately before the anal fin; its distance from the base of the caudal is less than that between opercle and pectoral.

The colour of preserved specimens is uniform whitish.

Anatomy.—The first organ which makes its appearance after the removal of the lateral portion of the cuirass is the air-bladder: its position and its extent are easily ascertained by holding the fish against the light, when an oblong oval spot will be visible which is more transparent than the rest; it commences on the same level with the root of the pectoral and extends backwards to the fourth rib. The œsophagus passes gradually into the stomach, which is situated below the air-bladder; it does not appear to be much wider than the intestine following; the latter makes a single complete circumvolution and then proceeds to the vent. Ovaria and testicles are situated behind the air-bladder.

The structure of the *vertebral column* is extremely singular, and perhaps unique among the Acanthopterygians. The abdominal portion is more than four times as long as the caudal; nevertheless it is composed of only six vertebræ, whilst the latter consists of fourteen. These abdominal vertebræ are extremely slender, the third alone being nearly as long as the whole caudal portion; they have a slight ridge superiorly and inferiorly and on each side; the whole portion lies in the uppermost concavity of the dorsal cuirass. The caudal vertebræ are extremely short, and the strength of their neural and hæmal spines is in proportion to their size.

I am of opinion that the dorsal cuirass is not a dermal production, but formed by modified parts of the endoskeleton; its composition, the number and position of its single parts, and, finally, the first dorsal spine, which in *A. punctulata* is so singularly attached to it, favour this opinion. The plates which occupy the vertebral line would correspond to the neural spines, and the lateral plates on which the ribs are suspended, to the parapophyses. *Amphisile* may be considered as a Chelonian form among fishes.

2. Amphisile punctulata.

Amphisile, sp., *Klein, Miss. Pisc.* iv. p. 28. tab. 6. fig. 6.
? Centriscus scutatus, *Forsk. Descript. Anim.* p. xvii.
Amphisile punctulata, *Bianconi, Spec. Zool. Mos.* fasc. x. 1854, p. 221. tab. 1. fig. 2.
—— brevispinis, *Peters in Wiegm. Arch.* 1855, p. 259.
—— punctata, *Kner in Sitzgsber. Wien. Acad.* 1860, xxxix. p. 534. fig. 2.

B. 4. D. 3 | 10. A. 13. C. 11. P. 12. V. 4.

The first dorsal spine is joined to, and not quite half as long as, its interneural; the distance of the posterior margin of the operculum from the root of the pectoral equals its distance from the anterior margin of the orbit. Head and body with several series of well-defined, round, deep-black dots.

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* According to Kner, the ventral fins are united and the middle rays are prolonged in the male sex.

Red Sea. Coast of Mozambique.

a, b. Dried. Red Sea. Purchased of Mr. Cuming.

This is a very distinct species, which differs from *A. scutata* in the following points besides those mentioned :—

1. The interorbital space is convex, striated, without longitudinal groove.
2. The operculum is subsemicircular, not quite twice as long as high, with a small prominence at its inferior convex margin.
3. The horizontal portion of the humerus which is visible externally is of moderate length, rather broad on its middle, and obliquely truncated behind ; the coracoid, which is situated immediately below, has its basal portion not styliform, as in *A. scutata,* but it is broad like the humerus above.
4. There are ten or eleven ribs.
5. The distance of the ventral from the pectoral equals that of the latter from the eye.
6. A series of black dots commences on the rostral tube and runs along the edge of the cuirass ; a second short series is composed of some dots disposed on the ribs ; a third series along the margin of the belly ; a fourth along the side of the back ; and, finally, there are some other dots on the vertebral line.

3. Amphisile strigata.

? Amphisile scutata, *Bleek. Banda,* i. p. 245.

D. 3 | 10. A. 12. C. 10. P. 12. V. 4.

The distance of the posterior margin of the operculum from the root of the pectoral is somewhat less than its distance from the anterior margin of the orbit. A black streak runs from the snout through the eye and base of the pectoral, along the lower edge of the dorsal cuirass ; it is double between the eye and gill-opening, and undulated along the side.

Java ; ? Banda.

a. Five and a half inches long. Purchased of Mr. Jamrach.

This species appears to be more closely allied to *A. punctulata* than to *A. scutata,* having the thoracic region as short as the former, or even shorter. It will be readily recognized by this character and by the black longitudinal band. The extremity of the snout and the first dorsal spine are broken off; but the latter appears to have been joined to the dorsal cuirass, as in *A. punctulata.* The species differs from *A. scutata* and agrees with *A. punctulata* in all the points which have been named in the description of the latter species, except that the ventral fins are somewhat nearer to the pectoral. The body, however, is considerably more elongate than in *A. punctulata.* Whilst the third and fourth lateral shields of the cuirass are not much longer than deep in *A. punctulata,* the third shield is much longer than deep in the present species, and the fourth is twice as long as deep.

Fam. 45. FISTULARIDÆ.

Bouches en flute, part., *Cuv. Règne Anim.*
Fistularidæ, part., *Müll. Berl. Abhandl.* 1844, p. 201; *Owen, Lect. Comp. Anat.* i. p. 49.
Aulostomatoidei et Fistularoidei, *Bleek. Enum.* pp. xxiii & xxvi.

Fishes of greatly elongated form; the anterior bones of the skull are much produced, and form a long tube terminating in a narrow mouth. Teeth small. Parts of the skeleton and dermal productions form external mails; scales none, or small. The spinous dorsal fin is either formed by feeble isolated spines or entirely absent; the soft dorsal and anal of moderate length; ventral fins abdominal, composed of six rays, without spine; they are separate from the pubic bones, which remain attached to the humeral arch. Branchiostegals five; air-bladder large; four gills; pseudobranchiæ. Pyloric appendages in small number; intestinal tract short. Vertebræ very numerous.

Tropical parts of the Atlantic and of the Indian Ocean.

Synopsis of the Genera.

Body scaleless	1. Fistularia, p. 529.
Body with small scales.............................	2. Aulostoma, p. 535.

1. FISTULARIA.

Fistularia, sp., *L. Syst. Nat.* i. p. 515.
Solenostomus, sp., *Klein & Gronov.*
Fistularia, *Lacép.* v. p. 349.
Cannorhynchus, *Cant. Catal.* p. 211.

Body scaleless. Caudal fin forked, with the two middle rays produced into a filament; no free dorsal spines. Teeth small.

Tropical parts of the Atlantic and of the Indian Ocean.

1. Fistularia tabaccaria.

Parra, p. 63. tab. 30. fig. 1; *Marcgr.* p. 148; *Catesby, Carol.* ii. p. 17. tab. 17. fig. 2.
Fistularia tabaccaria, *L. Mus. Ad. Fried.* i. p. 80. tab. 26. fig. 2, and *Syst. Nat.* i. p. 515; *Bl.* viii. p. 126. tab. 387. fig. 1; *Bl. Schn.* p. 114; *Cuv. Règne Anim.*; *Guérin, Iconogr. Poiss.* pl. 45. fig. 1.
Solenostomus, *Gronov. Mus.* i. p. 11. no. 31, and *Zoophyl.* p. 119. no. 365; *Klein, Pisc. Miss.* iv. p. 25. nos. 4 & 5; *Brown, Jamaica*, p. 441. no. 1.
Fistularia petimba, *Lacép.* v. pp. 349, 350.
Flagellaria fistularis, *Gronov. Syst. ed. Gray*, p. 146.
Aulastoma marcgravii, *Casteln. Anim. nouv. ou rares de l'Amér. Sud, Poiss.* p. 30. pl. 9. fig. 3.

D. 16. A. 16. P. 15. V. 6. C. 3+6 | 2 | 6+3.
Vert. 4+49 | 33.

The outer edge of the tube is smooth, or so indistinctly serrated as to be scarcely visible. Greenish-olive, with blue spots and stripes along the upper parts of the head and body.

Tropical parts of the Atlantic. Western coast of Central America.

a. Adult: bad state. Bahia. Purchased of M. Parzudaki.
b. Adult: stuffed. Rio Janeiro. Presented by A. Fry, Esq.
c. Adult. West Indies. From Mr. Scrivener's Collection.
d. Adult: bad state. From the Haslar Collection.
e. Half-grown: bad state. Western coast of Central America. Collected by Captain Dow; presented by Dr. P. L. Sclater, Secr. Zool. Soc.
f. A very young specimen, caught near St. Thomas's Island (Gulf of Guinea) by the Zoologist of the Congo Expedition, proves the occurrence of the genus on the African side of the Atlantic. The specimen is very small, and probably belongs to this species.

Description.—The head is produced into a long depressed tube, terminating in a mouth of moderate width. The length of the head is one-third of the total (the caudal filament not included). The cleft of the mouth is horizontal, extending nearly as far backwards as the maxillary. The lower jaw is prominent, and terminates in a fleshy knot; upper lip very distinct, separated from the intermaxillary by a deep groove. The intermaxillary is styliform, half as long as the maxillary, and not protractile; the maxillary is rather elongate, and somewhat dilated posteriorly; the mandible has two deep longitudinal furrows on its outer surface. The membrane which unites the jaw-bones is very wide and lax, allowing of great dilatation of the mouth; and in a specimen in which the tube apparently is not thicker than the little-finger of a man, tube and mouth can be so expanded that the thumb can easily pass. The jaws and palatine bones are armed with a series of small teeth; the vomerine series is very short.

The upper surface of the head is covered with a very thin skin. The middle portion of the tube is more elevated than the lateral ones, and formed by ridges which are confluent on the middle of the ethmoid bone, and more divergent posteriorly than anteriorly, the lateral edge of the tube is very indistinctly serrated, or rather crenulated. The eye is elongate, ovate, much longer than high; its horizontal diameter is one-half the length of the portion of the head behind the orbit; it is protected by prominent angles of the frontal bones anteriorly and posteriorly; the bony bridge between the orbits is concave and narrow, its width being less than the vertical diameter of the orbit. Crown of the head flat, with a bundle of longitudinal striæ on each side. The nostrils are close together, one before the other, in front of the anterior angle of the orbit and on the upper surface of the head. The operculum is twice as long as high, striated, and obtusely rounded behind; the suboperculum occupies a triangular space between the operculum and præoperculum, and is carried backwards along the inferior margin of the opercle. Præoperculum with numerous crenulated striæ, and with its posterior portion very short and occupying a nearly horizontal situation; the interoperculum is exceedingly long and narrow, hidden below the præoperculum and tympanic. The gill-opening is wide, closed above the operculum; the gill-membranes are only slightly united at the base of the urohyal. Five slender branchiostegals: the first (nearest to the subopercle) is divided into two branches, so that one might easily take it for two branchiostegals; they are, however, united at the base. Four gills, with a wide slit behind the fourth; pseudobranchiæ well-developed. The arcus branchiales have no internal rakers; the lower pharyngeals are very narrow, provided with a long series of villiform teeth; a series of three elongate patches of similar teeth on each side of the roof of the pharynx. The glossohyal is exceedingly elongate, half as long as the tube.

The bony shields which protect the anterior portion of the trunk, and are situated immediately below the skin, will be better described with the skeleton. This portion of the trunk has the muscles much less developed than the posterior; the shields are the following:—

1. A narrow strip along the median line.
2. A pair of broader ones occupying the sides of the back.
3. A narrow one on the side.
4. The pubic bones on the belly.

The ventral fins are situated on the muscular portion of the trunk, and a strip of bony, needle-like ossifications, imbedded in the skin, runs from each fin to the pubic shield, being continued posteriorly along the whole length of the side of the abdomen nearly to the caudal fin. The body is much depressed, broader than high, and gradually tapering posteriorly; it is naked; the lateral line is marked by pores and by small, narrow, bony shields, which are sunk in the skin anteriorly, and become broader and more projecting on the tail, where they form a sort of serrature. The lateral line commences in the scapulary region, is curved towards the median line of the back, running along the whole length of the dorsal shield, and then bent downwards, proceeding along the middle of the side. The vent is situated immediately before the anal fin.

The pectoral fin has an obliquely curved base and a rounded margin; it is scarcely longer than the bony orbit, and all its rays are simple; there is a small foramen posteriorly in its axil. The ventral fin is much shorter than the pectoral, and composed of six soft rays, the outer being the longest, simple, and articulated towards its extremity. Both fins are widely apart from each other, and their distance from the pectoral is one-third of that from the caudal. The dorsal fin is much higher than long, and composed of simple and unarticulated compressed rays, the sixth of which is the longest; the posterior rays decrease rapidly in length; the fin is opposite to the anal, and its distance from the caudal fin is one-fourth of that from the occiput. Anal fin very similar to the dorsal. The caudal fin is deeply forked; its two middle rays are produced into one exceedingly long filament; sometimes they are disconnected from each other, forming two filaments; the upper and lower rays are simply forked.

The colour of the upper parts is reddish-brown, variegated with numerous blue spots on the sides and on the back.

Skeleton.—The crown of the head is flat, striated, with a large oblique groove behind each orbit. The principal frontal bones are rather narrow between the orbits, widened anteriorly and posteriorly, and forming projecting corners before and behind the orbit; they do not extend very far forwards, and form only the basal portion of the rostral tube. The greater part of the upper surface of the snout is formed by the ethmoid, whilst the vomer occupies the anterior fourth or fifth. The præfrontal is situated in front of the orbit, elongate and triangular. There is a deep and long groove on the side of the snout for the muscles of the jaws; its bottom is entirely ossified, and formed by the tympanic, præoperculum, entopterygoid, pre- and meso-tympanic, these bones being exceedingly long. The entopterygoid and pretympanic are situated immediately below the ethmoid, and provided with a crenulated ridge which is externally visible. The bones which in other fishes constitute the bottom of the tympanic cavity below the orbit, are carried forwards before the orbit in *Fistularia*; the epitympanic appears to be absent. The intermaxillary is only half as long as the maxillary, and has very short posterior processes; maxillary dilated posteriorly; mandibula with a deep longitudinal exterior groove. Turbinal bone very small; infraorbitals none.

The process on which the humeral arch is suspended is very long, reaching as far backwards as the operculum; suprascapula and scapula short, simple; the humerus emits a process backwards for the coracoid, another downwards for the radius or ulna, and finally a third for its symphysis. There are three bones participating in the symphyseal junction of the humeral arch: the urohyal, which is very elongate, the humeral and the pubic bones. Radius and ulna reduced to a single subcircular bone; there are four narrow, longish carpal bones.

The shields which protect the anterior portion of the trunk are the following:—

1. A narrow strip along the median line of the back behind the skull; they are, in fact, confluent neural spines, belonging to the anterior portion of the vertebral column, which we shall presently describe.

2. The pair of broader lateral dorsal shields are peculiar bones—separated processes of the occipital bone—similar to those we have observed in *Mugil*, where, however, they are not separated from the occipital, and arise more outwards than in *Fistularia*. These shields are the longest, provided inferiorly with a ridge, which is prolonged and extends far backwards between the muscles of the back. This ridge is flexible, and does not interfere with the lateral movements of the fish; it appears to serve as a base for the attachment of muscular fibres.

3. The narrow shield on the side is the coracoid, and composed of two bones, the posterior of which is somewhat dilated and fixed to the lateral dorsal shields.

4. The ventral shields are the pubic bones; their posterior half is broadest, porous inferiorly; they are narrower before the middle,

leaving a free lanceolate space between them, and are again a little widened anteriorly, where they join the humerus and urohyal.

The anterior portion of the *vertebral column* shows the same peculiarity as in *Dactylopterus*: it is a long compressed tube, evidently composed of four elongate vertebræ, which are not joined, but perfectly anchylosed; each of them has a pair of small foramina for blood-vessels. The neural spines and parapophyses of this tubiform portion are confluent into thin laminæ, the lateral of which are wing-like, expanded in their anterior half. There are, besides, forty-nine abdominal and thirty-three caudal vertebræ; each vertebra has five deep impressions, and those of the abdominal portion and a part of the caudal have long parapophyses. The neural spines are short, the interneurals long, horizontally situated, so that they form together one continuous bony strip; the hæmals are much divergent at the base, leaving space for a wide channel. Ribs none.

	inches.	lines.
Length of the tubiform portion of the vertebral column	4	4
——— of the abdominal portion	9	8
——— of the caudal portion....................	5	6
Total length	19	6

2. Fistularia serrata.

Pike Fish Conger, *Dampier, Voy. New Holl. in Coll. Voy.* iii. pl. facing p. 184.
Fistularia tabaccaria, *White, Voy. Bot. Bay*, p. 296. fig. 2.
—— tabaccaria, var., *Bl.* viii. p. 130. taf. 387. figs. 2, 3; *Bl. Schn.* p. 114. *Russell*, ii. p. 58. pl. 173.
Fistularia immaculata, *Cuv. Règne Anim.*; *Richards. Ichth. Chin.* p. 247; *Faun. Japon. Poiss.* p. 320; *Bleek. Amb. & Cer.* p. 281, and *Verhand. Acad. Wetensch. Amsterd.* i., *Japan*, p. 11.
—— serrata, *Cuv. Règne Anim.* (after *Bloch*).
—— commersonii, *Rüpp. N. W. Fische*, p. 142; *Peters in Wiegm. Arch.* 1855, p. 258.
Cannorhynchus immaculatus, *Cant. Catal.* p. 211.
Skeleton: *Rosenth. Ichthyot. Taf.* ix. figs. 8–12 (Fistularia tabacaria).

B. 7. D. 13–15. A. 14–15. V. 6. C. 2+6 | 2 | 6+2.
Vert. 47/34 (*Rüpp.*), 47/29 (*Rosenth.*).

The outer edge of the tube is very distinctly serrated. Brownish-grey, silvery beneath; sometimes some bluish spots on the back or on the sides.

From the coast of Mozambique to the Seas of China and New Holland.—The head of this species is very distinctly figured by Bloch, and on this figure Cuvier has founded the species *F. serrata*.

a. Half-grown: bad state. Madras. Presented by T. C. Jerdon, Esq.
b. Half-grown. Bengal. Presented by General Hardwicke.
c. Half-grown. Singapore.
d. Half-grown: stuffed. Sea of Pinang. From Dr. Cantor's Collection.
e–f. Half-grown and young. Amboyna. Purchased of Mr. Frank.

g–h, i, k, l. Adult, half-grown, and young. China.
m. Adult: stuffed: bad state. East Indies.
n, o, p, q, r, s–u. Adult, half-grown, and young.
v, w, x. Adult and half-grown: stuffed.

Description.—The tube into which the head is produced is exceedingly long, the part of the head situated behind the orbit being contained six times and a half in its length; it is as high as broad near its base, and somewhat compressed in its anterior portion; a vertical cut across its middle would be hexagonal. The length of the entire head is contained twice and two-thirds in the total length (the caudal filament not included). The form of the mouth and the teeth are the same as in *F. tabaccaria*, except that the lower jaw is somewhat more prominent, and the teeth on the vomer appear to be quite rudimentary, if present at all.

The upper surface of the head is covered with a very thin skin; the middle portion of the tube is much more elevated than the lateral ones, at least on the basal half of the tube, and formed by crenulated ridges, the outer of which arise from the anterior angle of the orbit, first convergent, and then keeping a parallel direction. The lateral edge of the tube is very distinctly serrated, and provided with rather prominent spines posteriorly. The eye is elongate, ovate, much longer than high; its horizontal diameter is one-half of its distance from the base of the pectoral fin; it is protected by prominent angles of the frontal bones anteriorly and posteriorly; the bony bridge between the orbits is concave and narrow, its width being less than the vertical diameter of the eye. Crown of the head rather convex, with slight crenulated striæ. The nostrils are close together, one before the other, in front of the anterior angle of the orbit, on the side of the head. The operculum is not quite twice so long as high, and covered with a thick membrane, which is prolonged beyond the margin of the bone and fixed to the base of the pectoral fin. The form and situation of the sub- and præ-operculum are nearly the same as in *F. tabaccaria*. The gill-opening is wide, but does not extend upwards beyond the base of the pectoral. Six slender branchiostegals. The anterior part of the trunk is shielded by the same number of bony lamellæ as in *F. tabaccaria*. The air-bladder is situated immediately between the lateral lamellæ, and the body is here transparent. The pubic shields cover the whole anterior portion of the abdomen, except a small ovate spot between the pectoral fins.

The body is much depressed, nearly twice as broad as high; it is naked, without the dermal ossifications found in *F. tabaccaria*. The lateral line is marked by pores and small, narrow, bony shields, which are sunk in the skin anteriorly, becoming broader on the tail, and armed with a compressed spine directed backwards. The spines form together a kind of serrature. The course of the lateral line is the same as in *F. tabaccaria*.

The base of the pectoral fin is obliquely curved; the fin is somewhat longer than the orbit and rounded; there is a small foramen posteriorly in its axil. The ventral fin is much shorter than the pectoral and composed of six soft rays; both fins are widely apart from each other, and their distance from the pectoral is two-sevenths of that from the caudal. The form and position of the vertical fins is the same as in *F. tabaccaria*. There is a series of feeble spines imbedded in the skin along the median line of the back and of the abdomen: these spines do not belong to the endoskeleton; for if the skin is removed, these spines follow, and are easily detached from its outer surface. They are evidently rudiments of the spinous portion at least of the dorsal fin, which, in *Aulostoma*, is more developed, the spines being free.

Greyish, silvery along the lower part of the head; sometimes a series of blue spots along the side or the back.

The greater portion of the case formed by the bony shields behind the head is filled by the air-bladder, the membrane of which is thin, coating the interior surface of the upper and lateral shields, and firmly attached posteriorly to the muscular mass which commences behind those shields. A portion of the stomach and the liver also are enclosed in that anterior portion of the abdominal cavity. The stomach is elongate, subcylindrical, and passes gradually into the intestine, which is short and straight to the vent. I observe only one short pyloric appendage, enveloped by a portion of the pancreas, which is situated along the whole posterior side of the stomach and encircles its pyloric portion. The spleen is elongate, ovate. The abdominal cavity is extremely narrow from the point where the muscular mass of the vertebral column commences. The kidneys are thick and very long, extending along the whole abdominal cavity upwards to the air-bladder.

A comparison of this species with *Gasterosteus spinachia* will show the close relation of the *Fistularidæ* and *Gasterosteidæ*.

2. AULOSTOMA.

Fistularia, sp., *L. Syst. Nat.* i. p. 515.
Solenostomus, sp., *Klein & Gronov.*
Aulostoma, *Lacép.* v. p. 357.
Polypterichthys, *Bleek. Ternate,* ii. p. 608.

Body covered with small scales. Caudal fin rhombic, without filiform rays; a series of isolated feeble dorsal spines. Teeth rudimentary.

Tropical parts of the Atlantic and of the Indian Ocean.

The Atlantic and Indian species of this genus are so closely allied to each other that they were confounded by Linné and the following ichthyologists. Müller and Troschel were the first to distinguish the Atlantic species by a separate name. These fishes have always been described as toothless, in consequence of which Dr. v. Bleeker, who saw the patches of rudimentary teeth, describes the Indian form as new, creating a genus, *Polypterichthys*, for it.

The species of *Aulostoma* show the same peculiar structure of the anterior portion of the vertebral column as *Fistularia*. These two genera belong to one and the same natural family.

1. **Aulostoma coloratum.**

Parra, p. 65. lam. 30. fig. 2.
Fistularia chinensis, part., *L. Syst. Nat.* i. p. 515.
Solenostomus, *Gronov. Zoophyl.* p. 119. no. 366.
Aulostomus chinensis, part., *Lacép.* v. p. 357.
Aulostoma coloratum, *Müll. & Trosch. in Schomb. Hist. Barbad.* p. 673.
—— maculatum, *Valenc. in Cuv. Règne Anim. Ill. Poiss.* pl. 92. fig. 2.
Solenostomus chinensis, *Gronov. Syst. ed. Gray*, p. 147.

D. 9–10 | 23–24. A. 24–26. V. 6. P. 15. C. 3+15+3.
Cæc. pyl. 2.

The anterior rays of the soft dorsal and anal fins with a black cross-band, parallel to, and somewhat remote from, the base of the fins. Ventral fins immaculate.

Caribbean Sea.

a, b–c. Adult and half-grown. Cuba. From the Collection of the Zoological Society.
d–l. Adult and half-grown: stuffed and skins. Caribbean Sea.
m, n, o, p–q. Adult, half-grown, and young.
r. Adult: skin. From Gronow's Collection.

Description.—The head of this singular fish is produced into a long compressed tube, terminating in a mouth which is comparatively small. The length of the head is somewhat less than one-third of the total. The cleft of the mouth is slightly oblique when closed, with the extremity of the lower jaw somewhat prominent and compressed into a sort of keel. A small barbel hangs down from the symphysis. The intermaxillary is feeble, styliform, not protractile, whilst the maxillary is broad, lamelliform, and triangular. The upper jaw is united to the lower by a broad membrane, which renders the cleft of the mouth much narrower than one would expect from the extent of the jaw-bones.

Although Cuvier and the following authors have denied the presence of teeth, patches of minute ones are distinctly visible; they become more conspicuous if the head is allowed to dry. The intermaxillary is perfectly toothless; the mandible has a short and narrow band on the edge near the symphysis, and a broad rough patch on its inner surface; there is a similar patch on the palatine bones, whilst the vomer is provided with a long, very narrow band of minute teeth. The inner concave part of the branchial arches and the upper and lower pharyngeal bones have patches of villiform teeth.

The diameter of the eye is one-half or two-fifths of the extent of the part of the head behind it; the space between the orbits is flat or a little concave, with a slight ridge on each side, both converging anteriorly and soon meeting in a point. The eye does not appear to be comparatively smaller in adult specimens than in young ones, as is the case in most *Teleostei*. The nostrils are close together, one before the other, in front of the orbit and on the side of the head. The operculum is subquadrangular, longer than high; the suboperculum occupies a triangular space between the operculum and præoperculum, and is carried backwards along the inferior margin of the opercle. Four slender branchiostegals. The gill-opening extends to below the eye, the gill-membranes being attached to the front end of the urohyal; the glossohyal is very long and slender. Four gills, with a narrow slit behind the fourth; pseudobranchiæ well developed.

A long narrow bony shield, half as long as the snout, is joined to the occiput and extends along the neck. The body is compressed, highest between the origin of the dorsal and anal fins, whilst the tail behind these fins is very low; its greatest depth is one-fifth of the length of the head, and the least depth of the tail is only one-third of the depth between the vertical fins. It is covered with small ctenoid scales, which have the free margin strongly ciliated; there are about thirty-five in a vertical line below the anterior dorsal spines.

The pectoral fins have a broad, slightly oblique base and are rounded; they are shorter than the part of the head behind the orbit. The ventrals are one-third nearer to the anal than to the base of the pectoral; they are shorter than the pectorals, and have the rays of nearly equal length, the outer ray being simple, but articulated. The spinous dorsal fin is generally composed of nine or ten slender spines; they are feeble, about as long as the orbit, and remote from one another; each has a broad membrane behind, and can be received in a slight groove; if laid backwards they scarcely touch one another. The soft dorsal and the anal are opposite to each other; the length of the base of the former is nearly equal to its distance from the caudal, and a little less than the length of the base of the anal; the anterior rays are short; the fourth is the longest, forming the highest part of the fin: the anal is similar in shape to the dorsal. Caudal rhombic, with the two middle rays longest.

Ground-colour brownish-olive (in spirits), with one or two series of brown (blue) dots along each side of the back; another rather irregular series of round brown spots from the præoperculum along each side of the belly to the anal fin. Three or four silvery lines along each side of the abdomen, interrupted on the head, where they are replaced by irregular oblique streaks; a brown streak along the posterior margin of the maxillary; each nostril with a brown spot. The seven anterior dorsal and anal rays are crossed by a black streak parallel to, and rather remote from, the base of the fins; caudal fin with two round black spots, one above the other, the lower being sometimes absent.

The *stomach* is spacious, elongate, with thin membranes, which become thicker towards the pylorus; it passes without curvature or dilatation into the intestine, which is extremely short, quite straight, without curve or circumvolution, and rather wider at its commencement than posteriorly; two pyloric appendages of moderate size on each side of the pyloric portion of the stomach. Air-bladder large.

From the shortness and simple structure of the intestinal tract, the inference might have been drawn that this fish is carnivorous; and the stomach, indeed, contained the remains of small fish.

2. Aulostoma chinense.

Valent. Ind. Amb. iii. p. 448. fig. 323, p. 502. fig. 494; *Renard, Poiss. Mol.* i. pl. 3. fig. 18; ? *Petiver, Gazophyl.* tab. 68. fig. 1.
Fistularia chinensis, part., *L. Syst. Nat.* i. p. 515.
Aulostomus chinensis, part., *Lacép.* v. p. 357.
Aulostoma chinense, *Schleg. Faun. Japon. Poiss.* p. 320; *Richards. Ichth. Chin.* p. 247; *Peters in Wiegm. Arch.* 1855, p. 258.
Polypterichthys valentini, *Bleek. Ternate,* ii. p. 608.

D. 8–12 | 24–27. A. 27–28. V. 6.

The base of the soft dorsal and anal fins is black; sometimes another short black streak above, across the anterior rays. Ventral fin with a round black spot at the base. Sometimes nearly uniform, without markings.

From the coast of Mozambique to the Western Pacific.

This species is so closely allied to *Aul. coloratum,* that a detailed description would agree with that given of the other species in nearly every respect. The crown of the head is more rugose, and the three single plates of which the nuchal shield is composed are more distinct. The pectoral is somewhat shorter, equal in length to the ventral fin, the outer ray of which is sometimes branched as well as articulated. The tail behind the vertical fins is a little more slender, equal in length to the base of the soft dorsal fin. Some individuals show the markings more distinctly than others.

Var. *α.*

Body with lighter longitudinal streaks and with indistinct darker cross-bands. Maxillary band, ventral and two caudal spots, basal band of the dorsal and anal fins, and a spot above the dorsal band, very distinct and of a deep-black colour.

a. Fine specimen. Amboyna. Purchased of Mr. Frank.
b, c. Adult and half-grown.

Var. *β.*

Body uniform; maxillary band indistinct; ventral and one superior caudal spot deep black; basal band of the dorsal and anal fins rather short.

d. Fine specimen. Amboyna. Purchased of Mr. Frank.

Var. *γ.*

Body uniform; maxillary band pale; ventral spots and anal band absent. Only one spot on the caudal fin superiorly; traces of the basal band of the dorsal fin scarcely visible.

e. Eighteen inches long: stuffed. Aneiteum. From Mr. Macgillivray's Collection.—Another specimen from the same Collection, which has not been purchased for the British Museum, belonged to *var. β.*

Fam. 46. MASTACEMBELIDÆ.

Acanthopterous Eels.
Scomberoidei, pt., *Cuv. & Val.* viii. p. 441.
Notacanthi, pt, *Müll. Berl. Abhandl.* 1844, p. 201; *Owen, Lect. Comp. Anat. Vert.* i. p. 49.
Rhynchobdelloidei, *Bleek. Enum. Spec.* p. xxiii.

Body elongate, eel-like, covered with very small scales. Mandibula long, only slightly moveable. Dorsal fin very long, the anterior portion composed of numerous free spines; anal fin with spines anteriorly. Ventral fins none. The humeral arch is not suspended from the skull. Gill-opening reduced to a slit at the inferior part of the side of the head. Gills four, pseudobranchiæ none; an air-bladder. Branchiostegals six. Pyloric appendages two.

Fresh waters of the East Indies.

The structure of the mouth (not of the bones of the upper jaw) and of the gill-apparatus, the separation of the humeral arch from the skull, the absence of ventral fins, the anatomy of the internal parts, and the whole habit, afford ample proof that these fishes are eels, in which a part of the dorsal fin is spinous. There is not one Scomberoid fish to which they have any affinity, which has been clearly shown by Müller; but he fell into much the same error as Cuvier did, when he united these fishes with *Notacanthus*, a genus which has no affinity whatever to the present family. Dr. v. Bleeker groups them together with *Aulostoma* and *Notacanthus* in one order. It is impossible to refer *Aulostoma* and *Fistularia* to two different families, *F. serrata* having dorsal spines; but they are rudimentary, and hidden in the skin. See p. 535.

Synopsis of the Genera.

Snout with an appendage, concave and transversely striated inferiorly	1. RHYNCHOBDELLA, p. 539.
Snout with an appendage, which is not transversely striated	2. MASTACEMBELUS, p. 540.

1. RHYNCHOBDELLA.

Mastacembelus, sp., *Gronov. Zoophyl.* p. 133.
Rhynchobdella, sp., *Bl. Schn.* p. 478.
Rhynchobdella, *Cuv. & Val.* viii. p. 444.

Body elongate, eel-like, covered with very small scales; head elongate, pointed anteriorly, the upper jaw terminating in a long moveable appendage, which is concave and transversely striated inferiorly. Cleft of the mouth narrow, with the lower jaw very little moveable. Minute teeth in the jaws and on the vomer. Præoperculum not armed.

Fresh waters of the East Indies.

1. Rhynchobdella aculeata.

Pentophthalmus, *Willughb. App.* tab. 10. 428.
Mastacembelus, sp., *Gronov. Zoophyl.* p. 133.
Enchelyopus, sp., *Klein, Pisc. Miss.* iv. p. 58. n. 18.
Ophidium aculeatum, *Bl.* tab. 159. f. 2.
Rhynchobdella orientalis, *Bl. Schn.* p. 478.
—— aral, *Bl. Schn.* p. 479. taf. 89.
Macrognathus aculeatus, *Lacép.* ii. p. 284; *Buch. Ham. Fish. Gang.* p. 29.
Ophidium rostratum, *Shaw, Zool.* iv. p. 73.
Macrognathus ocellatus, *Buch. Ham. l. c.* p. 29.
Rhynchobdella aral, *Cuv. & Val.* viii. pl. 239.
—— ocellata, *Cuv. & Val.* viii. p. 445; *Bleek. Verh. Batav. Genootsch.* xxiii., *Notac.* p. 5.
Mastacembelus pentophthalmus, *Gronov. Syst. ed. Gray*, p. 172.

D. (13) 18–20 | 52–54. A. 3 | 52. Vert. 32/40.
Cæc. pylor. 2.

Vertical fins not contiguous; a series of two to eight black, white-edged ocelli along the base of the soft dorsal fin.

Fresh waters of the East Indies.

a. Adult: dried. Calcutta. From Mr. Griffith's Collection.
b. Adult. Calcutta. From the Collection of Messrs. von Schlagintweit.
c. Adult. Madras. Presented by T. E. J. Boileau, Esq.
d–f. Adult. Khasya. Presented by Sir W. Hooker.
g. Fine specimen. Ceram. From the Collection of Madame Ida Pfeiffer.
h, *i*. Adult. Moluccas.
k–m. Adult. Borneo.
n–p, *q–r*, *s*, *t*. Adult and half-grown. East Indies.
u. Nine inches long.—Type of *Ophidium rostratum*, Shaw.

Var. siamensis: D. 13 | 55. A. 3 | 58. Five black ocelli along the base of the dorsal fin; a pair of confluent ocelli at the base of the caudal. Dorsal spines very feeble.—Having only one specimen, we do not feel that we should be justified in describing it as a separate species.

a. Fine specimen. Pachebore. From M. Mouhot's Collection.

2. MASTACEMBELUS.

Mastacembelus, sp., *Gronov. Zoophyl.* p. 133 (not *Klein*).
Mastacembelus, *Cuv. & Val.* viii. p. 452.

Body elongate, eel-like, covered with very small scales; head elongate, the upper jaw terminating in a long moveable appendage, which is not transversely striated inferiorly. Cleft of the mouth rather narrow, with the lower jaw very little moveable. Minute teeth in the jaws. Præoperculum with spinous teeth at the angle (except in *M. maculatus*).

Fresh waters of the East Indies, extending westwards to Syria.

1. Mastacembelus pancalus.

Macrognathus paucalus, *Buch. Ham. Fish. Gang.* p. 30. pl. 22. fig. 7.
Mastacembelus pancalus, *Cuv. & Val.* viii. p. 455; *Bleek. Verhand. Batav. Genootsch.* xxv., *Beng. en Hindost.* p. 98.
? Mastacembelus punctatus, *Cuv. & Val.* viii. p. 463.

D. 25–26 | 35–40. A. 36–40.

The cleft of the mouth extends scarcely to the vertical from the nostril. Vertical fins not contiguous. Body brown, with small, round, lighter dots; vertical fins whitish, dotted with black.

Fresh waters of Bengal.

a–c, d. Half-grown. Ganges. Presented by G. R. Waterhouse, Esq.—Types of the species.
e. Half-grown. Ganges. From Mr. MacClelland's Collection.
f, g, h. Half-grown. Calcutta. From the Collection of Messrs. von Schlagintweit.
i–k, l–p, q. Adult, half-grown, and young. Bengal.

2. Mastacembelus zebrinus.

Blyth in Journ. As. Soc. Beng. 1859, p. 281.

Twenty-eight or twenty-nine dorsal spines. Tail detached from the dorsal and anal fins. Pale brown, deeper along the back, and marked throughout (more distinctly in the young) with dusky transverse stripes, alternating with fainter stripes more or less regular, which latter are often double or more or less divided, and are set off by the narrow pale interspaces. Dorsal and caudal fins minutely striated; the anal with broad stripes, as on the sides. (*Bl.*)

Maulmein.

3. Mastacembelus aleppensis.

Simak-el-inglese, Ingely, *Russell, Nat. Hist. Aleppo,* ii. 2nd edit. (Lond. 1794), p. 208. pl. 6.
Mastacembelus, sp., *Gronov. Zoophyl.* no. 402. tab. 8 *a.* figs. 1, 2.
Ophidium simak, *Walb. Artedi,* iii. p. 159.
—— mastacembelus, *Shaw, Zool.* iii. p. 71.
Rhynchobdella haleppensis, *Bl. Schn.* p. 480.
Mastacembelus aleppensis, *Cuv. & Val.* viii. p. 454.
—— syriacus, *Gronov. Syst. ed. Gray,* p. 172.
? Macrognathus caudatus, *MacClell. Calc. Journ. Nat. Hist.* ii. p. 586.

D. 32–34 (35) | 80. A. 3 | 80.

The maxillary extends to the vertical from the anterior margin of the orbit. Vertical fins continuous, sometimes a notch between them. Above blackish, variegated with dark-yellow spots; yellowish below; anal fin yellow near its commencement, the rest, like the dorsal and caudal, being spotted with black.

River Kowik. ? Afghanistan.

a, b, c. Types of the species: bleached. Aleppo. From A. Russell's Collection.
d. A fourth specimen, with thirty-five dorsal spines, and of a uniform brownish-black colour, is not specifically different from the typical individuals; it was received from the East India Company.

4. Mastacembelus unicolor.

Mastacembelus unicolor, (*Kuhl & v. Hass.*) *Cuv. & Val.* viii. p. 453; *Bleek. Verhand. Batav. Genootsch.* xxiii., *Notac.* p. 5.

D. 33–34 | 80–84. A. 3 | 75–81.

The vertical fins are distinct from one another and only continuous at the base. Brownish above, yellowish below; sides with large oblong light-coloured spots; vertical fins brownish, edged with yellow; pectorals with two brown cross-bands.

Java.

5. Mastacembelus erythrotænia.

Bleek. Verh. Batav. Genootsch. xxiii., *Notac.* p. 6, and *Borneo,* i. p. 10.

D. 34–37 | 70–75. A. 3 | 71.

The maxillary does not extend to the vertical from the anterior margin of the eye. Vertical fins continuous. Black or brown, with four more or less irregular red longitudinal bands, the second of which commences at the angle of the mouth; vertical and pectoral fins black, with red margin.

Rivers of Borneo.

a. Adult. Borneo. Named *M. giganteus.*
b. Adult. Borneo. Named *M. pictus.*

6. Mastacembelus argus.

D. 32 | 60. A. 3 | 56.

Præoperculum with two or three spines. The maxillary does not extend to the vertical from the anterior margin of the eye. Vertical fins continuous. Brownish-black, with white bands and round white spots: a band from the occiput, along the middle of the back, passing into the white margin of the vertical fins; a second band above the eye, interrupted and lost on the side of the back; a third from the angle of the mouth, passing into a series of spots, which is continued to the caudal; another series of spots along the side of the belly; the soft dorsal with a series of six spots. Pectoral black at the base and near the margin.

Fresh waters of Siam.

a. Fine specimen. Siam. From M. Mouhot's Collection.

The appendage of the snout is trilobed, and shorter than the cleft of the mouth. No notch is visible between the vertical fins.

	inches.	lines.
Total length	9	0
Length of the head (with appendage)	1	9
Length of the tail (from vent)	3	6

7. Mastacembelus armatus.

Macrognathus armatus, *Lacép.* ii. p. 286; *Buch. Ham. Fish. Gang.* pp. 28, 364. pl. 37. fig. 6.
Rhynchobdella polyacantha, *Bl. Schn.* p. 479.
Mastacembelus armatus, *Cuv. & Val.* viii. p. 456. pl. 240; ? *Sykes in*

Trans. Zool. Soc. ii. p. 350. tab. 60. fig. 2; *Bleek. Verhand. Batav. Genootsch.* xxv., *Hind. en Beng.* p. 97.
Mastacembelus ponticerianus, *Cuv. & Val.* viii. p. 460.
—— marmoratus, *Cuv. & Val.* viii. p. 461; *Jacqu. Voy. Ind. Poiss.* pl. 14. fig. 2.
Macrognathus undulatus, *MacClell. Calc. Journ. Nat. Hist.* iv. p. 398. pl. 22. fig. 1.
—— hamiltonii, *MacClell. l. c.* p. 393.
? Mastacembelus venosus, *Val. in Jacqu. Voy. Ind. Poiss.* pl. 14. fig. 1.

D. 35–39 | 79–87. A. 3 | 79–87. Cæc. pylor. 2. Vert. 39/53.

The maxillary extends to the vertical from the nostril. Vertical fins continuous. Brownish-olive: a brown band from the snout through the eye, forming irregular zigzags along the side, and emitting cross-bars to the dorsal and anal fins.

Var. Head with two rather irregular longitudinal brown bands. A series of very distinct brown spots along the base of the dorsal and anal fins; sides of the body with brown reticulated bands.

Fresh waters of Ceylon, Bengal, and Chusan.

a. Var. *armata.*

a. Adult. Calcutta. From the Collection of Messrs. v. Schlagintweit.
b–d. Half-grown. Siam. From M. Mouhot's Collection.
e–f, g. Adult. East Indies.

β. Var. *ponticeriana.*

h–i, k, l. Adult, half-grown, and young. Ceylon. Purchased of Mr. Cuming.
m. Young. Nepal. Presented by B. H. Hodgson, Esq. (*Mastacembelus hodgsonii,* Kaup).
n. Adult: stuffed. East Indies. From the Collection of the Zoological Society.
o. Adult: skeleton. Ceylon. Purchased of Mr. Cuming.

γ. A very old female does not show any markings, but is uniform brown.

p. Very fine specimen: sixteen inches long. Ceylon. Purchased of Mr. Cuming.
q. Adult: stuffed. Calcutta. From the Collection of the East India Company.

8. **Mastacembelus maculatus.**

Rhynchobdella maculata, *Reinw.*
Mastacembelus maculatus, *Cuv. & Val.* viii. p. 461; *Règne Anim. Ill. Poiss.* pl. 55. fig. 1; *Bleeker, Blitong,* p. 93.

D. 26–30 | 60–70. A. 3 | 59–69.

Præoperculum without spines. Vertical fins continuous. Brown, clouded with darker; vertical fins with a yellow margin, dorsal with a series of blackish spots along the base.

Fresh waters of Blitong, Java, and Sumatra.

Fam. 47. NOTACANTHI.

Notacanthi, pt., *Müller, Berl. Abhandl.* 1844, p. 165.

Body elongate, covered with very small scales; snout protruding beyond the mouth. Eyes lateral, of moderate size. Dentition feeble. Dorsal fin short, composed of short free spines, a soft portion being either entirely absent or quite rudimentary; anal very long, anteriorly with many spines; ventrals abdominal, composed of more than five soft and of several unarticulated rays.

Seas of the arctic and temperate regions of both hemispheres.

The fishes of this family have the spinous portion of the dorsal fin of the Acanthopterygians, and the structure and situation of the ventral fins of the Malacopterygians. When their anatomy and the structure of their gills and pharyngeal bones are better known, they will, no doubt, form a distinct Order. Cuvier and Valenciennes ranged them with the Scomberoids! Müller formed a separate family for them and for *Mastacembelus*.

All these fishes have been hitherto referred to one genus; but the species which we shall mention as the last, is probably the type of a second genus, for which the name proposed by Fabricius might be used.

1. NOTACANTHUS.

Notacanthus, *Bloch, Ausl. Fische*, xii. p. 114.
Campylodon, *Fabric. Vidensk. Selsk. Skr. Kjöbenh.* iv. p. 22.

Characters the same as of the family.

Arctic Seas. Mediterranean. Australian Seas.

1. Notacanthus nasus.

Notacanthus nasus, *Bl.* xii. p. 114. taf. 431; *Bl. Schn.* p. 390; *Cuv. & Val.* viii. p. 467. pl. 241; *Cuv. Règne Anim. Ill. Poiss.* pl. 55. fig. 2; *Gaimard, Voy. en Isl. et au Grönl. Zool. Poiss.* pl. 11.
Campylodon, *Fabric. Vidensk. Selsk. Skr. Kjöbenh.* iv. p. 22. pl. 10. fig. 1.
Campylodon fabricii, *Reinh. Vidensk. Selsk. naturvid. og mathem. Afhandl.* vii. 1838, p. 120.

B. 8. D. 9–10. A. 13–14 | 116. C. 8. P. 17. V. 3/8. L. lat. 400.

The first dorsal spine is opposite to the ventral fin.

Greenland.

The typical specimen of Bloch is in the Berlin Museum, that of Fabricius in Copenhagen. The differences in the descriptions of Fabricius and Valenciennes, as pointed out by Prof. Reinhardt, do not appear to have originated in a specific difference of the two specimens.

2. Notacanthus bonapartii.

Risso in Wiegm. Arch. 1840, p. 376. pl. 10 (description and figure incorrect); *Filippi e Verany in Memor. Accad. Sc. Torin.* ser. 2. t. xviii. p. 4 (sep. copy).

D. 9. A. 15 | 120.

The ventrals are completely united, so as to form but one fin. Palatine teeth in a double series. Tail tapering. Anal fin black.

Mediterranean.

3. Notacanthus mediterraneus.

Filippi e Verany in Memor. Accad. Sc. Torin. ser. 2. t. xviii. p. 1 (sep. copy).

D. 6 | 1. A. 12 | 132. V. 4/8.

Scales extremely small. The ventrals are completely united, so as to form but one fin. A small ray in the axil of the last dorsal spine. Palatine teeth in a single series. Uniform silvery.

Mediterranean.

4. Notacanthus sexspinis.

Richards. Voy. Ereb. & Terr. Fishes, p. 54. pl. 32. figs. 4–11.

D. 6 | 1. A. 14 | ? P. 13–14. V. 2/7.

The ventrals are completely united to each other, so as to form but one fin, its base being before the vertical from the first dorsal spine. A small, forked, jointed ray stands in the axil of the last dorsal spine.

King George's Sound. Australia.

5. Notacanthus rissoanus.

Filippi e Verany in Memor. Accad. Sc. Torin. ser. 2. t. xviii. p. 6 (sep. copy).

Nasal portion produced into a proboscis. Thirty or more spinous finlets on the back. (*Fil. & Ver.*)

Mediterranean.

ADDENDA ET CORRIGENDA.

Page 4, note.

6. Gobius reticulatus, *Eichw.*, is, according to Kessler, identical with *G. ophiocephalus*, Pall.
9. Gobius cephalarges, *Pall.*, has been described by Kessler, *Bull. Soc. Nat. Mosc.* 1859, ii. p. 237.—It is not quite evident how this fish differs from *G. stevenii*; its head appears to be somewhat longer—one-fourth of the total length.
14. Gobius quadricapillus, *Pall.*, is different from the fish described by Nordmann under the same name; the latter is identical with *G. jozo.*

Page 5, note.

41. Bostrychus sinensis, &c., is to be erased.

Page 6, note.

45. Gobionellus hastatus, *Girard*, has been figured in *U. S. & Mex. Bound. Surv. Fishes*, p. 25. pl. 12. figs. 7–8; but the figure does not agree with the description, representing six dorsal spines, and not seven as stated in the text.
50. Gobius lyricus, *Girard*, is described at p. 550.
51. Gobius würdemanni, *Girard*; another insufficient description may be found in *U. S. & Mex. Bound. Surv. Fishes*, p. 25.
52. Gobius catulus, *Girard, U. S. & Mex. Bound. Surv. Fishes,* p. 26. pl. 12. figs. 9, 10.—This fish appears to be closely allied to *G. soporator.*
53. Gobius gulosus, *Girard, U. S. & Mex. Bound. Surv. Fishes,* p. 26.

Page 9. Insert instead of **Gobius ratan**:—

2. Gobius marmoratus.

Gobius marmoratus, *Pall. Zoogr.* iii. p. 161; *Rathke, Fauna der Krym,* p. 327; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 435, *Poiss.* pl. 12. fig. 3; *Kessler, Bull. Soc. Nat. Mosc.* 1859, 2. p. 252.
—— semilunaris, *Kessler, Beitr. Ichthyol. süd-westl. Russl.* p. 14.

D. 6 | (16—) 18 (—20). A. (14—) 17–18*. L. lat. 44–47.

Head higher than broad, its length being contained four times and a third in the total; snout of moderate extent, with the jaws of equal length. The vent is one-third nearer to the end of the snout than to the extremity of the caudal. The cleft of the mouth does not quite extend to below the anterior margin of the eye. Two longish tubes above the upper lip, opposite the nostrils. The upper portion of the operculum scaly; eight or nine scales in a transverse series on the end of the tail. Olive, with subquadrangular brownish spots; a pair of whitish spots on the base of the caudal fin, and a single one below the eye. All the fins, except the ventrals, with series of brown dots, those on the second dorsal and on the anal having an oblique direction.

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* See pp. 51, 550.

Coasts of the Black Sea, entering rivers.

Page 9. **Gobius ratan.**

Prof. Kessler has given a more detailed description of this species, from which it appears that it has more than fifty scales in the lateral line, and therefore must be transferred to division B. See p. 551.

Page 9. **Gobius syrman.**

The figure given by Nordmann represents the scales too large. According to the examination of Prof. Kessler, it has 61–65 in the lateral line, and it must therefore be transferred to division B. See p. 551.

Page 10. **Gobius melanio.**

This proves to be identical with *G. paganellus*, p. 52.

Page 11. **Gobius niger.**

i'. Adult. Alexandria. From Mr. Petherick's Collection.

Page 12. **Gobius jozo.**

Add to the synonymy:—

Gobius jozo, var. pontica, *Kessler, Bull. Soc. Nat. Mosc.* 1859, 2. p. 255.
—— quadricapillus, *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 433, *Poiss.* pl. 13. fig. 3.

Page 17. Add the following species:—

22 *a*. **Gobius leopardinus.**

Nordm. in Demid. Voy. Russ. Mérid. iii. p. 436, *Poiss.* pl. 13. fig. 4; *Kessler, Bull. Soc. Nat. Mosc.* 1859, 2. p. 258.

D. $6 \mid \frac{1}{9}$. A. $\frac{1}{9}$. L. lat. 44.

Body elongate, roundish; head broader than high, its length being not quite one-fourth of the total. Diameter of the eye one-fourth of the length of the head. Nape of the neck naked, with minute warts. Lower jaw rather longer than the upper. The second dorsal and the anal decrease in height posteriorly. Ventral long, one-fourth of the total length, covering the vent. Yellowish-grey with oblong brown spots along the lateral line; a large blackish spot on the lower jaw, another at the base of the pectoral. All the fins with series of brown dots. (*Kessl.*)

Crimea.

Page 24. Add a new species:—

35 *a*. **Gobius macrostoma.**

Gobiopsis macrostomus, *Steindachner in Sitzgsber. Wien. Acad.* 1861, xlii. p. 291. fig. 6.

D. 6 | 11. A. 10. L. lat. 33.

Cleft of the mouth very wide, extending behind the vertical from the posterior margin of the orbit; eye small, one-seventh of the length of the head. The height of the body is contained seven times and a half in the total length, the length of the head three times and two-thirds to three times and three-fourths. Head depressed, broader than high; the width of the interorbital space is nearly equal to that of the orbit. The teeth of the outer series are the strongest. The soft dorsal is higher than the spinous or than the body. Caudal rounded. Vertical fins with dark streaks. (*Steind.*)

Bombay.

This species is allied to *Gobius giuris* and *viridipunctatus*.

Page 26. Add the following species:—

38 *a*. **Gobius coalitus.**

Benn. Proceed. Comm. Zool. Soc. i. 1831, p. 166.

D. $6 \left| \frac{1}{9} \right.$. A. $\frac{1}{8}$. L. lat. 40.

Thirteen longitudinal series of scales between the origins of the second dorsal and anal. The height of the body is contained five times and a half in the total length, the length of the head four times and a fourth. Head rather broader than high, its height being more than one-half of the length of the head. Snout somewhat longer than the eye, the diameter of which is one-fifth of the length of the head, and equal to the width of the interorbital space, which is flat. Cleft of the mouth oblique, with the jaws equal anteriorly, and with the maxillary scarcely extending beyond the vertical from the anterior margin of the eye. Teeth in broad villiform bands, those of the outer series being somewhat larger. Head naked; scales on the nape and on the anterior part of the back small, becoming larger and ctenoid posteriorly. The distance of the first dorsal fin from the eye is more than that of the snout from the præoperculum. The fourth dorsal spine is the longest, shorter than the posterior soft rays, which are higher than the tail underneath and extend beyond the base of the caudal. Caudal rounded. The upper pectoral rays silk-like; the ventral does not extend on to the vent. Greenish-olive, irregularly marbled with darker; series of pearl-coloured spots run along the rows of scales. The second dorsal and the caudal with series of whitish dots.

Mauritius.

a. Fifty-seven lines long. From the Collection of the Zoological Society.—Type of the species.

Page 26. **Gobius soporator.**

Gobius catulus, Girard, U. S. & Mex. Bound. Surv. Fishes, p. 26. pl. 12, figs. 9, 10, appears to be closely allied to this species.

The first and second dorsal spines are the longest.

Specimen *l.* is from the coast of Sicily, and from Mr. Gerrard's Collection.

Page 27. Add the following species :—

39 *a*. **Gobius knerii.**

Steindachner in Sitzgsber. Acad. Wiss. Wien. 1861, xlii. p. 287. fig. 1.

D. 6 | 10. A. 9. L. lat. 36.

The height of the body is one-sixth of the total length, the length of the head two-ninths. Snout obtuse, shorter than the eye, the diameter of which is one-third of the length of the head, or twice the width of the interorbital space. Cleft of the mouth oblique, extending to below the anterior half of the orbit, with the lower jaw rather prominent. Teeth of the outer series largest. Scales on the anterior part of the back much smaller than those on the body. Dorsal fins not very close together, as high as the body; the first dorsal spine is the longest: the ventral fin terminates at some distance from the vent. No warty stripes on the head; cheeks naked. Body with narrow, darker vertical streaks; a brown spot at the base of the caudal; dorsal fins with brownish longitudinal lines; the other fins transparent, immaculate. (*Steind.*)

Coast of the Island of Lessina (Dalmatia).

Page 35. **Gobius notacanthus.**

This species is described and figured by Steindachner in *Sitzgsber. Wien. Acad.* 1861, vol. xlii. p. 290. fig. 2. Steindachner has found a small prominence above the angle of the præoperculum, which reminds one of a similar peculiarity in *Gobius oplopomus*; he calls the species *Oplopomus notacanthus*.

Page 43. Add a new species :—

80 *a*. **Gobius paradoxus.**

D. 6 | 11. A. 9. L. lat. 14.

The head and the trunk are entirely naked to between the second dorsal and the anal, the remainder is covered by ctenoid scales of moderate size; there are nine or ten of them in one of the anterior transverse series. The height of the body is contained five times and two-thirds in the total length, the length of the head four times and a quarter. Head nearly as broad as high, its width being rather more than one-half of its length. Eyes rather close together, of moderate size. Snout obtuse, rounded, as long as the eye; cleft of the mouth slightly oblique, with the jaws equal in length, and with the maxillary extending to below the middle of the eye. Teeth in villiform bands; there are two curved canine teeth on each side of the lower jaw. The first dorsal spine is elongate, filiform, sometimes extending to the base of the caudal; caudal rounded, shorter than the head; none of the pectoral rays silk-like; the ventral terminates at a great distance from the vent. Blackish (in spirits), caudal and ventral fins black; the dorsal filament whitish.

Western coast of Central America.

a–b. Seventeen lines long. Collected by Captain Dow; presented by Dr. P. L. Sclater, Secr. Zool. Soc.

Page 44. **Gobius macrostoma.**

During the printing of this Catalogue, I received that part of vol. xlii. of the *Sitzungsberichte* of the Vienna Academy in which Herr Steindachner has described a *Gobiopsis macrostomus*. As I cannot acknowledge *Gobiopsis* as a well-founded genus, but refer this species to *Gobius*, I am obliged to alter the name of the new species described at p. 44, Herr Steindachner's description being of an earlier date. I therefore propose to call it *Gobius microphthalmus*.

Page 46. Add another species:—

87*a*. **Gobius lyricus.**

Girard, Proc. Acad. Nat. Sc. Philad. 1858, p. 169, and *U. S. & Mex. Bound. Surv. Fishes*, p. 25. pl. 12. figs. 4, 5 (incorrect).

D. 6 | 12. A. 12.

Scales of moderate size. The height of the body is one-sixth of the total length, the length of the head two-elevenths, that of the caudal one-fourth. Snout obtuse, with the anterior profile rounded; cleft of the mouth nearly horizontal, with the jaws subequal anteriorly, and with the maxillary extending to below the pupil of the eye. The middle rays of the first dorsal filiform; the ventral extends to the vent. Reddish-brown, with dark cross-bars. (*Girard.*)

Brazos Santiago (Texas).

Page 51. **Gobius marmoratus.**

Kessler's investigations have rendered necessary considerable alterations in our former account of the Gobies of the Black Sea, for which we relied chiefly on Nordmann. Thus, for instance, we were induced, by the figure quoted, to suppose that this fish belongs to the division of small-scaled species; but Kessler says that it has 44–47 scales in the lateral line. We can scarcely believe, however, that all the specimens examined by the different authors really belong to the same species when we look at the number of the fin-rays; these are—

D. 18.	A. —	according to	Pallas.
D. 18–20.	A. 18	,,	Nordmann.
D. 16–19.	A. 14–17	,,	Kessler.

Page 56. **Gobius capito.**

a′. Adult. Alexandria. From Mr. Petherick's Collection.

Page 51. Insert instead of **Gobius marmoratus**:—

98. Gobius ratan.

Nordm. in Demid. Voy. Russ. Mérid. iii. p. 416, *Poiss.* pl. 11. fig. 2; *Kessler, Bull. Soc. Nat. Mosc.* 1859, 2. p. 239.

D. 6 | 17 (18). A. 14–15. L. lat. 55–58.

The height of the body is one-fifth of the total length, the length of the head one-fourth; the diameter of the eye is two-ninths of the length of the head; eyes close together; cleft of the mouth extending to below the anterior margin of the eye; lips thin and narrow; the upper half of the operculum scaly. The soft dorsal is highest behind the middle; the ventral does not extend on to the vent, which is one-fourth nearer to the end of the snout than to that of the caudal fin. Brownish-black, irregularly spotted with lighter; the first dorsal yellow at the top, the second with black bands.

Shores of Odessa. Bug.

Page 51. Add another species:—

98 *a*. Gobius syrman.

Nordm. in Demid. Voy. Russ. Mérid. iii. p. 419. pl. 12. fig. 1 (incorrect); *Kessler, Bull. Soc. Nat. Mosc.* 1859, 2. p. 238.

D. 6 | 19–20. A. 15–16. L. lat. 61–65.

The height of the body is one-fifth of the total length, the length of the head one-fourth; head a little broader than high; cleft of the mouth extending nearly to below the anterior margin of the eye; lips fleshy, broad; the diameter of the eye is nearly one-fifth of the length of the head; the upper third of the operculum scaly; anus a little nearer to the end of the snout than to the end of the caudal; eleven or twelve longitudinal series of scales on the posterior portion of the tail. Yellowish-brown, irregularly brown-spotted; fins blackish, uniform or with more or less distinct spots. (*Kessl.*)

Odessa. Krym.

Page 51. **Gobius batrachocephalus.**

Add to the synonymy:—

Rathke, Fauna der Krym, p. 323; *Kessler, Bull. Soc. Nat. Mosc.* 1859, 2. p. 232.

The crown of the head is scaleless.

Page 52. Add another species:—

100 *a*. Gobius fluviatilis.

Gobius fluviatilis, *Pallas, Zoogr.* iii. p. 162; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 429; *Steindachner, Sitzungsber. Wien. Acad.* xlii.

1861, p. 288. taf. 1. fig. 3; *Kessler, Beitr. Ichthyol. südwestl. Russl.* p. 7, and *Nachtr.* p. 7, and *Bull. Soc. Nat. Mosc.* 1859, 2. p. 247.
Gobius lacteus, *Nordm. l. c.* p. 430. pl. 10. fig. 3.

D. 6 | 16–18. A. 15–16. L. lat. 60–65.

The height of the body is one-sixth of the total length, the length of the head one-fifth; head a little broader than high. The diameter of the eye is contained five times and a half in the length of the head, and more than the width of the interorbital space; snout longer than the eye, with the lower jaw longest, and with the maxillary extending to below the front margin of the eye. Nape of the neck scaly; there are twenty-six scales between the forehead and the spinous dorsal. The spinous dorsal lower than the body; anterior dorsal rays longer than the posterior. Brownish, upper parts irregularly spotted with darker; dorsal and caudal fins with series of brown dots; a brown spot superiorly at the base of the pectoral.

Rivers of Southern Russia. River Casoli near Brussa.

This Goby, which we have placed among the doubtful species (p. 4), has lately been fully described and figured by Steindachner (who also refers *G. sordidus*, Benn., to its synonymy) and by Kessler; the latter distinguishes a dark-coloured variety with the dorsal fins yellow- and with the caudal white-edged; and a light variety (*G. lacteus*, Nordm.).

Gobius stevenii (p. 52) differs in having a wider mouth, the maxillary extending to behind the middle of the orbit, and also in the form of the soft dorsal fin, which has the posterior rays longest.

Page 52. **Gobius lacteus**

is a variety of *G. fluviatilis*, according to Kessler, Bull. Soc. Nat. Mosc. 1859, 2. p. 247.

Page 52. Insert instead of *Gobius lacteus*:—

101. **Gobius gymnotrachelus.**

Kessler, Nachträge zur Ichthyol. des südwestl. Russl. p. 12, and *Bull. Soc. Nat. Mosc.* 1859, 2. p. 233.

D. $6 \left| \frac{1}{16\text{–}17} \right.$. A. $\frac{1}{13\text{–}14}$. L. lat. 60–70.

Head only a little broader than high; crown of the head and nape of the neck naked; cleft of the mouth extending nearly to below the anterior margin of the eye; lower jaw not much prominent. Yellowish-grey, with brown transverse bands obliquely descending forwards; lateral line with blackish spots; pectoral, dorsal, and caudal fins with dark bands. (*Kessler.*)

Dnjester, Dnjeper, and Bug.

Page 52. **Gobius platyrostris.**

We gave the diagnosis of this species from the account of Nordmann; it appears, however, from the examination of Prof. Kessler, that two species have been confounded under the name *platyrostris*, and that the fish figured by Nordmann is specifically different from that of Pallas:—

102. Gobius platyrostris.

Pall. Zoogr. iii. p. 154; *Rathke, Fauna der Krym*, p. 325; ? *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 410; *Kessler, Bull. Soc. Nat. Mosc.* 1859, 2. p. 235.

D. 6 | $\frac{1}{16-17}$. A. $\frac{1}{12-14}$. L. lat. 72–74.

Head large, depressed, one-fourth of the total length; lower jaw rather longer than the upper; lips fleshy, very broad, the upper lip especially dilated; the length of the ventral fin is rather less than one-seventh of the total. Crown of the head scaly. Brownish-grey, spotted with darker; fins (except ventral) dark grey, lighter at the base, with blackish streaks.

102 *a*. Gobius kessleri.

Gobius platyrostris, *Nordm. l. c.* pl. 24. fig. 1; *Kessler, zur Ichthyol. südl. Russl.* p. 11; (not *Pall.*).

—— platycephalus, *Kessler, Nachträge zur Ichthyol. südwestl. Russl.* p. 16, and *Bull. Soc. Nat. Mosc.* 1859, 2. p. 234; (not *Richards.* or *Peters*).

D. 6 | $\frac{1}{16-18}$. A. $\frac{1}{13-14}$. L. lat. 65–75.

Head large, depressed, its length being contained twice and three-fourths in the total length; lower jaw prominent; crown of the head and upper portion of the operculum scaly; the length of the ventral fin is contained five times and a half in the total. Brownish-grey, with dark-brown spots; fins (except ventrals) with dark bands.

Dnjester, Dnjeper, and Bug.

102 *b*. Gobius trautvetteri.

Kessler, Bull. Soc. Nat. Mosc. 1859, 2. p. 244.

D. 6 | 17–19. A. 13–15. L. lat. 63–68.

Body tapering posteriorly; head scarcely broader than high, its length being one-fourth of the total. Cleft of the mouth extending to below the anterior margin of the eye; lower jaw projecting beyond the upper; lips rather narrow; nape of the neck and the upper portion of the operculum scaly. The second dorsal is highest behind the middle; length of the caudal one-fifth of the total. Nine or ten longitudinal series of scales on the hind part of the tail. Brownish, with whitish dots and a lateral series of five or six brown spots. (*Kessl.*)

Bug. Odessa.

Page 52. Gobius paganellus.

Add to the synonymy:—

Gobius melanio, *Pall. Zoogr.* iii. p. 157; *Rathke, Fauna der Krym*, p. 327; *Nordm. in Demid. Voy. Russ. Mérid.* iii. p. 412, *Poiss.* pl. 11. fig. 1; *Kessler, Bull. Soc. Nat. Mosc.* 1859, 2. p. 250.

Page 53. **Gobius melanostoma.**

Add to the synonymy:—

Rathke, Fauna der Krym, p. 325; *Kessler, Nachtr. zur Ichthyol. südwestl. Russl.* p. 7, and *Bull. Soc. Nat. Mosc.* 1859, 2. p. 249.

Page 54. **Gobius ophiocephalus.**

Add to the synonymy:—

Gobius ophiocephalus, *Rathke, Fauna der Krym,* p. 324; *Kessler, Nachträge zur Ichthyol. des südwestl. Russl.* p. 11, and *Bull. Soc. Nat. Mosc.* 1859, 2. p. 243.
—— reticulatus, *Eichw. Zool. Spec.* iii. p. 77.

Page 55. **Gobius capito.**

This is *G. exanthematosus* of Nordmann and Kessler (*Bull. Soc. Nat. Mosc.* 1859, 2. p. 241); but it is uncertain whether the description given by Pallas under that denomination has been taken from specimens of the same species.

Page 58. **Gobius minutus.**

Erase from the synonymy Gobius leopardinus, *Nordm.*

Page 60. **Gobius banana.**

v'. Fine specimen. West Indies. Presented by the Medical Officers, R.A., at Fort Pitt.

Page 64. **Gobius grammepomus.**

Add to the synonymy:—

Gobius litturatus, (*Heckel*) *Steindachner in Sitzungsber. Wien. Acad.* 1861, xlii. p. 289. figs. 4, 5.

The only difference from *G. grammepomus* is that in the specimen in the Vienna Museum the upper part of the operculum is scaly. The specimen was from the Philippine Islands.

Page 75. Add a new species:—

141 *a*. **Gobius seminudus.**

D. 6 | 15. A. 10.

Head and anterior portion of the trunk naked; sides with exceedingly small scales, becoming somewhat larger posteriorly. The height of the body is one-sixth of the total length, the length of the head one-fourth. Head with the cheeks swollen, depressed, broader than high, its width being two-thirds of its length. Eyes close together, directed upwards, of moderate size; snout obtuse, as long as the eye; cleft of the mouth slightly oblique, with the jaws equal anteriorly, and with the maxillary extending to below the middle of the eye. Teeth in villiform bands, the anterior of the lower jaw slightly enlarged; there are two small curved canine teeth on each side of the lower jaw. Dorsal fins rather low, the hind part of the spinous dorsal being scarcely lower than the anterior; caudal rounded, as long as the pectoral; none of the pectoral rays silk-like; ventral rather short, terminating at a great distance from the vent. Blackish, fins and sides of the head dotted with black; ventrals black.

West coast of Central America.

a–h. Collected by Captain Dow; presented by Dr. P. L. Sclater, Secr. Zool. Soc.

The largest of the specimens examined is two inches long. The species has such peculiar characters that it will be readily recognized. It has no natural affinity to the other small-scaled Gobies, which generally have an elongate form.

Page 79. Add a new species:—

2. **Euctenogobius sagittula.**

D. 6 | 13. A. 14. L. lat. 58.

Twenty longitudinal series of scales between the dorsal fin and the anus, twelve between the anterior portion of the second dorsal and the anal. The height of the body is one-eighth of the total length, the length of the head five times and two-thirds. The head is as high as broad, its width being somewhat more than one-half of its length. Eyes very close together. Snout obtuse, shorter than the eye, the diameter of which is one-fourth of the length of the head. Cleft of the mouth slightly oblique, with the jaws equal anteriorly, and with the maxillary not extending to below the centre of the eye. Head naked; scales on the nape and behind the axil very small, becoming larger posteriorly. The second dorsal spine is the longest, somewhat lower than the body underneath, but higher than the soft dorsal; caudal rather elongate and pointed, two-ninths of the total length. Pectoral shorter than the head; the ventral terminates at a great distance from the vent. Light greenish-olive, with a series of four brown spots along the middle of the tail; sides of the head with some irregular blackish-violet blotches; dorsal, caudal, and pectoral fins dotted with black, ventral and anal immaculate.

Western coast of Central America.

a. Thirty-one lines long. Collected by Captain Dow; presented by Dr. P. L. Sclater, Secr. Zool. Soc.

This species has another series of very small teeth within the maxillary front series; these internal teeth do not appear to be fully developed, but destined to replace those in function. The teeth of the lower jaw form a very narrow band anteriorly, and stand in a single series posteriorly.

Page 80. **Latrunculus albus.**

The number of the fin-rays varies a little :—

$$D.\ 5 \left| \frac{1}{12\text{–}13}. \right. \quad A.\ \frac{1}{12\text{–}14}.$$

All the specimens, the longest of which is 21 lines in length, have lost the scales; there were 25 in a longitudinal series, if the series correspond to the divisions of the muscles.

Gobius pellucidus of Nardo and Kessler is probably identical with *L. albus*; the only difference which I can make out, by a comparison of Kessler's description with the Scotch specimens, is in the relative size of the eye, which is rather larger in *G. pellucidus*. Kessler's specimens were 17 lines long.

2. **Latrunculus pellucidus.**

?Aphya cobitis, *Rondel.* p. 210.
Gobius pellucidus, *Nardo, Giorn. Fis. Pavia*, iii. 1824, *Osservaz. etc.* p. 7.
Gobius pellucidus, *Kessler, Bull. Soc. Nat. Mosc.* 1859, 2. p. 260.

$$D.\ 5 \left| \frac{1}{11\text{–}13}. \right. \quad A.\ \frac{1}{13\text{–}14}. \quad L.\ lat.\ 24\text{–}25.$$

The diameter of the eye is one-fourth of the length of the head (in *L. albus* one-fifth), equal to (in *L. albus* less than) the extent of the snout, and more than the width of the interorbital space. Transparent.

Adriatic; Black Sea.

Page 85. The characters of *Gobiosoma molestum* are the following :—

1 *a*. **Gobiosoma molestum.**

Girard, Proc. Acad. Nat. Sc. Philad. 1858, p. 169, and *U. S. & Mex. Bound. Surv. Fishes*, p. 27. pl. 12. fig. 14.

$$D.\ 7 \mid 12. \quad A.\ 12.$$

The length of the head is one-fourth of the total. Jaws equal anteriorly. The maxillary does not extend to below the centre of the eye. Ventrals short. Dusky-brown, fins with blackish streaks. (*Girard.*)

Indianola, Texas.

Page 91. **Benthophilus macrocephalus.**

Add to the synonymy :—

Benthophilus macrocephalus, *Eichw. Fauna Casp.-Caucas.* p. 210. tab. 3. figs. 3 *a–c*; *Kessler, Bull. Soc. Nat. Mosc.* 1859, ii. p. 265.

Kessler has found that the number of the fin-rays is subject to some variation :—

$$D.\ 3\text{–}4 \left| \frac{1}{6\text{–}9}. \right. \quad A.\ \frac{1}{7\text{–}9}.$$

Nordmann and Eichwald appear to have described the gill-openings of too small a width; according to Kessler, they are narrower than in *Gobius*.

Page 97. Periophthalmus koelreuteri.

Var. KOELREUTERI.

a′–b′. Young. Ceylon. Purchased of Mr. Cuming.

Var. PAPILIO.

i′. Thirty lines long. Cape of Good Hope. Presented by the Officers of the Army Medical Department at Fort Pitt.
k′–l′. Half-grown. Grand Popoa. Presented by J. Couch, Esq.

Page 105.

Erase 8. Eleotris somnolentus, *Girard*, from the list of doubtful species.

Page 113. Add another species:—

9 *a*. Eleotris somnolenta.

Eleotris sumnulentus, *Girard, Proc. Acad. Nat. Sc. Philad.* 1858, p. 169, and *U. S. & Mex. Bound. Surv. Fishes*, p. 28. pl. 12. figs. 1–3.

D. 7 | $\frac{1}{8}$. A. $\frac{1}{9-10}$. L. lat. 35–36.

Nine series of scales between the origin of the second dorsal and the anal. The scales on the upper surface of the head are rather small and extend to the extremity of the snout, those on the side of the head to the præorbital. Scales minutely ciliated. The height of the body is contained four times and a fifth in the total length, the length of the head four times and a half to four times and two-thirds. Head obtuse, thick. The upper profile of the snout descending obliquely downwards in a nearly straight line. The diameter of the eye is one-seventh of the length of the head and one-third of the width of the interorbital space. The maxillary extends nearly to the vertical from the anterior margin of the orbit. Teeth moveable, villiform. Caudal rounded, a little shorter than the head. Greenish-olive; cheek with two indistinct darker streaks; a black spot on the shoulder. The second dorsal and anal with series of dark spots.

Fresh waters of Central America and Demerara.

The three specimens "with shorter head and caudal fin" (p. 112) belong to this species; three others have since been received.

d, e–f. Adult and half-grown. Cordova.

Page 115. Add a new species:—

13 *a*. Eleotris potamophila.

D. 6 | $\frac{1}{8}$. A. $\frac{1}{7}$. L. lat. 42.

Præoperculum without spine. Fourteen series of scales between the origins of the second dorsal and the anal fins. The scales on the neck are of moderate size, becoming gradually smaller anteriorly, twenty-three between spinous dorsal and snout (the small anterior ones included); they do not extend on the snout. Scales on the operculum smaller than those on the body; those on the cheek very small and numerous. Scales ciliated. The height of the body is contained six times and a half in the total length, the length of the head three times and a third. The eye occupies the third eighth of the length of the head, and its vertical diameter is one-half of the width of the interorbital space. Head rather broad and depressed, with the snout of moderate length, and with the lower jaw prominent. The maxillary extends beyond the vertical from the centre of the eye. Teeth card-like, in broad bands. Gill-membranes not attached to the isthmus. Vertical fins lower than the body; caudal rounded, equal in length to the pectorals, which are three-fifths of the length of the head. Reddish, irregularly marbled with brownish and blackish; brown spots on all the fins; the spinous dorsal black; a pair of brown spots on the base of the pectoral, visible interiorly and exteriorly.

Yan-tse-kiang.

a. Sixty-eight lines long. Obtained 230 miles from the mouth of the river. Presented by the Officers of the Army Medical Department at Fort Pitt.

b. Fine specimen. Chikiang. From Mr. Fortune's Collection.—I formerly referred this specimen to *E. obscura*, to which the present species is very closely allied; the latter, however, may be readily distinguished by the pair of brown spots at the root of the pectoral fin.

Page 116. **Eleotris butis.**

k. Adult. Canton. From Mr. Gerrard's Collection.

Page 119. **Eleotris dormitatrix.**

Add to the synonymy:—

Philypnus dormitator, *Girard in Report of U. S. & Mex. Bound. Surv. Fishes*, p. 29. pl. 12. fig. 13.

Page 122. **Eleotris gyrinus.**

Add to the synonymy:—

Girard in Report of U. S. & Mex. Bound. Surv. Fishes, p. 28. pl. 12. figs. 11, 12.

c–e. Half-grown and young. Caribbean Sea. Presented by the Officers of the Army Medical Department at Fort Pitt.

Page 125. **Eleotris fusca.**

r′. Adult. Canton (?). From Mr. Gerrard's Collection.

Page 145. **Callionymus curvicornis.**

n. Adult male. From Mr. Gerrard's Collection.

Page 148. **Callionymus longecaudatus.**

q′. Adult. From Mr. Gerrard's Collection.

Page 164. **Liparis pulchellus.**

Having seen the first part of the first volume of the *Proceed. Calif. Acad. Nat. Hist.*, I am enabled to add the formula of the fins in this species: Dr. Ayres, however, says that the vertical fins are so united that it is not easy to enumerate the rays:—

D. 47. A. 40. C. 11.

Girard has given an incorrect, or at least unintelligible description of the pectoral fins; according to Dr. Ayres's account, they have the same form as in *L. vulgaris*. The gill-opening is small, equal in width to the diameter of the eye; teeth tricuspid.

Page 165. **Liparis mucosus.**

It is evident from the short description given by Dr. Ayres that this species is very distinct from *L. pulchellus*; but the characters by which it differs from *L. callyodon*, Pall., have not been pointed out by its discoverer:—

"The length of the head is one-fourth of the total (the caudal excluded); snout rounded anteriorly, not truncated; longitudinal diameter of the eye nearly one-sixth of the length of the head. The dorsal and anal fins both arise at about the same points as in *L. pulchellus; they are not continuous with the caudal,* but terminate at its base, leaving that fin separate and distinct, with a rounded extremity. *The dorsal is emarginate* a short distance from its origin, giving in a degree the appearance of an anterior dorsal. Plain greenish-olive, lighter beneath.

"In the branchial aperture, form of the operculum, teeth, nostrils, pectoral and ventral fins, in the loose attachment of the skin, this species agrees well with *L. pulchellus*." (*Ayres.*)

San Francisco.

Page 166.

Erase *Batrachus apiatus* from the list of doubtful species.

Page 168. Add the following species:—

1 *a*. **Batrachus apiatus.**

Cuv. & Val. xii. p. 477; *Cuv. Règne Anim. Ill. Poiss.* pl. 85. fig. 3.

D. 3 | 19. A. 16. V. 1 | 2.

The skin on the crown of the head, on the cheek and on the chin is provided with reticulated folds; a series of pores runs along the side, and a vertical fold of the skin descends from each pore. The length of the head is two-sevenths of the total; the width of the bony bridge between the orbits is contained five times and a half in the length of the head, and equals the extent of the snout, which is longer than the eye. Gill-covers with four spines directed backwards, two belonging to the operculum and two to the suboperculum. Vomer and palatine bones with a series of conical teeth. Snout broad, depressed, flat, with a few very short tentacles at the angle of the mouth; orbital tentacles none. The maxillary extends to below the posterior margin of the orbit. No foramen in the axil. Yellowish, with large irregular blackish-brown cross-bands; fins with spots of the same colour.

Cape of Good Hope.

a. Adult. Cape Sea. Presented by the Officers of the Army Medical Department at Fort Pitt.

Pages 178 and 182. **BRACHIONICHTHYS.**

In the diagnosis read:—“ and *sometimes* with the soft dorsal.”

Page 182. **Brachionichthys hirsutus.**

a. Fine specimen. Tasmania. Presented by Dr. A. Günther.

Page 199. **Antennarius bigibbus.**

c. Adult. Presented by the Officers of the Army Medical Department at Fort Pitt.

Page 203. **Halieutæa stellata.**

Add to the synonymy:—

Bleek. Verhand. Acad. Wetensch. Amsterd. i., *Japan*, p. 10.

Dr. v. Bleeker has dissected this fish:—air-bladder and pyloric appendages absent; intestinal tract much longer than the fish, containing remainders of shells.

Page 207. Add to the *Synopsis of the Genera*:—

Ventral fins. Scales large. Barbel none ...	16. Dactyloscopus, p. 279.
Ventral fins. Scales large. A short compressed barbel	16 *a*. Myxodagnus, p. 563.
Ventral fins none. Scales small; lateral line none. Anal spine none. Gill-membranes separated by an isthmus	21 *a*. Anoplarchus, p. 564.

Page 212.

6. Blennius multifilis, *Girard*, is to be erased from the list of doubtful species.

Page 215. **Blennius tentacularis.**

Add to the synonymy:—

Blennius auritus, *Kessler, Bull. Soc. Nat. Mosc.* 1859, 2. p. 227.

Kessler has observed that the number of teeth varies according to the size of the specimens.

Page 216. Add another species :—

9 *a*. **Blennius melanio.**

Kessler, Bull. Soc. Nat. Mosc. 1859, 2. p. 230.

D. $\frac{12}{22}$. A. 24–25.

The height of the body is one-sixth of the total length, the length of the head a little more than one-fifth. Anterior profile of the snout rather abrupt; two strong curved teeth on each side of the lower jaw, none in the upper. Orbital tentacle short, simple, filiform. Uniform brownish-grey; a series of blackish spots along the margins of the dorsal and anal. (*Kessler.*)

Bay of Sebastopol.—Twelve to eighteen lines long.

Page 217. **Blennius vulgaris.**

Add to the synonymy :—

? Ichthyocoris varus, *Gervais in Rev. Zool.* 1859, p. 347.

Page 218. **Blennius sanguinolentus.**

Add to the synonymy :—

Blennius sanguinolentus, *Rathke, Fauna der Krym*, p. 34; *Kessler, Bull. Soc. Nat. Mosc.* 1859, 2. p. 227.

Kessler has made a very important observation in this species, viz. that the number of teeth increases with age; he found 38–40 in specimens six inches long, 26–28 in specimens two inches and a half, 22–24 in others one inch and a half.

Page 221. **Blennius pavo.**

Add to the synonymy :—

Blennius lepidus, *Rathke, Fauna der Krym*, p. 34; *Kessler, Bull. Soc. Nat. Mosc.* 1859, 2. p. 226.

Page 222. **Blennius galerita.**

Add to the synonymy :—

Blennius montagui, *Kessler, Bull. Soc. Nat. Mosc.* 1859, 2. p. 229.

This species was not previously known from the Black Sea.

Page 224. **Blennius crinitus.**

This species appears to have a very wide geographical range, a second specimen being from the Cape of Good Hope.

b. Adult. Cape Seas. Presented by the Officers of the Army Medical Department at Fort Pitt.

Page 225. **Blennius bifilum.**

b–c. Thirty-four lines long. Cape of Good Hope. Presented by the Officers of the Army Medical Department at Fort Pitt.

Page 225. Add another species :—

32*a*. **Blennius multifilis.**

Girard, Proc. Acad. Nat. Sc. Philad. 1858, p. 169, and *U. S. & Mex. Bound. Surv. Fishes*, p. 27. pl. 12. fig. 6.

$$D. \frac{13}{14}. \quad A. \frac{2}{18}.$$

The height of the body equals the length of the head, and is two-ninths of the total. Snout obtuse, with the anterior profile abruptly descending. Orbital tentacle long, with some cirrhi at the base; a curved tooth in both jaws; the spinous portion of the dorsal is continuous with, but lower than, the soft. Brownish, with darker spots on the back, dorsal and caudal fins. (*Girard.*)

St. Joseph's Island (Texas).

Page 228. Add another species :—

36*a*. **Blennius bufo.**

Pholis bufo, *Lowe, Proc. Zool. Soc.* 1843, p. 87.

$$D. \frac{12}{18\text{–}19}. \quad A. 20\text{–}21.$$

Allied to *B. trigloides*, and similar in habit to *B. sanguinolentus*. No curved tooth in the upper jaw. Orbital tentacle none; the interorbital space only slightly concave. Blackish-brown, variegated with lighter and darker, or light-brownish spotted with black. Pectoral with transverse series of black spots.

Discovered by the Rev. R. T. Lowe at Madeira, in localities where a slight run of fresh water enters the sea; the species grows to a length of 11–12 inches.

Page 248. **Salarias marmoratus.**

a. Type of the species. Sandwich Islands. From Mr. Gerrard's Collection.—The space between the base of the last dorsal ray and the caudal fin is one-tenth, not of the total length of the fish, but of the length of the dorsal fin.

Page 251. **Salarias dussumieri.**

b. Adult. Cape of Good Hope. Presented by the Officers of the Army Medical Department at Fort Pitt.

Page 269. **Clinus acuminatus.**

b. Adult. Cape Seas. Presented by the Officers of the Army Medical Department at Fort Pitt.

Page 273. **Cristiceps argentatus.**

Var. *Cristiceps antinectes.*

h′. Fine specimen. Freemantle. Presented by Dr. Bowerbank.

Page 275. **Cristiceps australis.**

c′. Adult. Freemantle. Presented by Dr. Bowerbank.

Page 279. **Dactyloscopus tridigitatus.**

Mr. Gill has favoured me with a further account of specimens examined by him; he distinguishes, now, two West Indian and one Californian species. The two former appear to me to be very closely allied, and identical with the specimens in the British Museum, although they all show slight differences from one another. Mr. Gill distinguishes—

a. *D. tridigitatus*, from Barbadoes, Cuba, and Key West, with the formula: D. 40. A. 34. L. lat. 45.

b. *D. poeyi*, from Cuba, with the formula: D. 42. A. 34. L. lat. 48.

The species from California is:—

2. Dactyloscopus pectoralis.

Dactyloscopus pectoralis, *Gill.*

D. 34. A. 28. L. lat. 40.

Light brownish-yellow, with dark spots arranged in lines, forming the outlines of about six dorsal quadrangular areas, from the angles of which other lines proceed downwards and converge towards those departing from the angles of the adjoining areas. A transverse blotch posteriorly between the orbits. Four rays diverge in pairs from each orbit; two dark spots on the crown; behind and below the orbit is a whitish area, with a dark spot before and behind; upper angle of the operculum whitish, bordered in front by a dark line or spot.

Caudal and pectoral fins much longer than in the West Indian species. (*Gill.*)

Cape St. Lucas, Lower California.

Page 279. Add a new genus:—

16*a*. MYXODAGNUS.

Myxodagnus, *Gill.*

Head rather elongate and acutely conical; eyes large, elliptical, very closely approximated; frontal bones extremely narrow. Lower jaw much projecting, with a short compressed flap or barbel in front of the symphysis. Dorsal fin behind the vertical of the anus. In other respects similar to *Dactyloscopus*, but with the membranaceous fold between the limbs of the lower jaw much reduced.

For the knowledge of this genus also I am indebted to the kindness of Professor Gill, who has sent me an abstract of the lengthened description which he will shortly publish in the *Proceedings of the Academy of Nat. Sc. Philad.*; unfortunately it was received when the printing of this volume was nearly completed.

1. Myxodagnus opercularis.

Gill, MS.

D. 36. A. 38. L. lat. 51.

The length of the head is one-sixth of the total, or four times the diameter of the eye. Light yellowish-brown; a margaritaceous spot behind and beneath the eye, another on the operculum. (*Gill.*)

Cape St. Lucas, Lower California.

Page 279. **Dictyosoma temminckii.**

Van der Hoeven (*Handb. d. Dierk.* ii. p. 347) has proposed the name of *D. bürgeri* for this fish, with which name it is described by Dr. v. Bleeker in *Verhand. Acad. Wetensch. Amsterd.* i., *Japan*, p. 9.

a. Half-grown. Japan.

Page 281. Add another species:—

2*a*. **Stichæus nubilus.**

Lumpenus nubilus, *Richards. Last Arct. Voy. Fishes*, p. 13. pl. 28.

D. 63. A. 43. V. 1/4.

Vomerine and palatine teeth none. The height of the body is one-eleventh of the total length. The upper jaw slightly overlapping the lower. Ventrals slender, about one-third the length of the head, composed of a short spine and two jointed rays, visible enough, with two others, very slender and shorter, looking like a single ray, fissured to the base. The lower pectoral rays shorter than the middle ones; vertical fins not continuous. Light-coloured, marbled with darker. (*Richards.*)

Wellington Sound.

Page 285. **Centronotus gunellus.**

Add to the synonymy:—

Blennius gunellus, *Pall. Zoogr.* iii. p. 173.

Page 287. **Centronotus fasciatus.**

Add to the synonymy:—

Gunellus fasciatus, *Richards. Last Arct. Voy. Fishes*, p. 11. pl. 27.

Page 289. **Centronotus crista galli.**

Professor Gill has sent me a notice of a Blennioid fish which I consider identical with *C. crista galli*, although, in his description, he does not mention the longitudinal crest on the head. As the sheet containing my description is printed, I regret that I am not able to adopt the specific denomination proposed in his letter. But he very truly observes that the gill-openings are separated by an isthmus, the membranes not being connected with each other as in *Centronotus*. The species, therefore, would belong to a different genus, named by Mr. Gill *Anoplarchus*, the other characters of which are the same as those of *Centronotus*. The name of the species will be *Anoplarchus crista galli*.

Page 373. **Spirobranchus capensis.**

d–f. Adult. Near Cape Town. Presented by the Earl of Derby.
g. Adult: stuffed.

Page 373. Add a new species:—

2. Ctenopoma microlepidotum.

D. $\frac{16}{10}$. A. $\frac{8}{10}$. L. lat. 34. L. transv. 6/11.

Operculum with a semicircular notch posteriorly; three or four spinous teeth at each of the two corners of the notch; edge of the suboperculum very indistinctly denticulated. A brown streak from the eye to the angle of the præoperculum.

Fresh waters of the Cape of Good Hope.

a. Six inches and a half long. Presented by the Officers of the Army Medical Department at Fort Pitt.

Description.—This splendid species will be readily distinguished by its small scales on the back, and by the armature of the opercles, which is much less developed than in *Ct. multispine*. The height of the body is two-sevenths of the total length (the caudal fin not included), the length of the head one-third. The interorbital space is flat, its width being equal to the extent of the snout, or to one-fourth of the length of the head; the diameter of the eye is somewhat less. Snout obtusely conical, with the lower jaw prominent, and with the maxillary not extending to below the middle of the eye. Præopercular margin entire, with the angle rounded; the operculum terminates in two processes, each of which is provided with three or four spinous teeth, and which leave a semicircular notch between them; the notch is filled by a membrane of blackish colour; the serrature of the suboperculum is very indistinct; interoperculum smooth. Six branchiostegals; the gill-membranes are united, not attached to the isthmus; the portion covering the isthmus is scaly. The head is covered with scales, except the snout: the scales on its upper surface are irregular, those on the cheek rather small, there being about eight series between the orbit and the præopercular margin; four transverse series of scales on the operculum, one along the sub- and interoperculum. Large pores indicate the course of the muciferous channels on the head.

The teeth in the jaws form a villiform band, those of the outer series being enlarged; bands of vomerine and palatine teeth narrow.

The spinous portions of the vertical fins are low, whilst the middle of the soft dorsal and anal fins is prolonged into a filament, extending beyond the base of the caudal. The caudal fin is subtruncated, its length being contained four times and two-thirds in the total; each caudal ray is produced beyond the connecting membrane into a short filament. Pectoral rounded, much longer than the ventral, which is composed of one spine and five rays.

Scales ciliated; the lateral line is interrupted above the origin of the anal, its two portions being nearly equal in length.

The superbranchial organ is a large round cavity on each side of the occipital region, closed inferiorly by a membrane; a broad, simple, thin bony lamella occupies the concavity of the upper portion of the first branchial arch. Four gills; a slit behind the fourth.

One or two other specimens of this fish are preserved in the Museum at Fort Pitt. In consequence of the discovery of a second species of *Ctenopoma*, a part of the diagnosis of that genus must be modified, as follows: some of the opercular pieces serrated; dorsal spines sixteen to seventeen; anal spines eight to ten.

Page 378. **Helostoma temminckii.**

b–c. Adult. Java. Purchased of Mr. Jamrach.

Page 380. **Polyacanthus signatus.**

m. Half-grown. Java. Purchased of Mr. Jamrach.

Page 382. **Osphromenus olfax.**

Goramy, *Hardw. in Zool. Journ.* iv. p. 309.

Important paper on the habits and the viviparous nature of this fish.

Page 483. **Channa orientalis.**

i. Young. Ceylon. Purchased of Mr. Cuming.

Page 499. **Gobiesox cephalus.**

a'. Half-grown. West Indies. Presented by the Officers of the Army Medical Department at Fort Pitt.

Page 528. **Amphisile strigata.**

b. Adult. Purchased of Mr. Frank.

Page 545. **Notacanthus sexspinis.**

a. Adult. Type of the species.

Page 90. Omitted by inadvertence.

8*a*. TRIDENTIGER.

Tridentiger, *Gill, Ann. Lyc. Nat. Hist. New York,* 1858, December.

Body subcylindrical, covered with ctenoid scales of moderate size; head depressed, flat, with the snout obtuse; cleft of the mouth subhorizontal, with the jaws nearly equal anteriorly. Eyes of moderate size. Teeth in both jaws in a double series, those of the outer series tricuspid. Two dorsal fins, the anterior with six flexible spines; caudal quite free; ventrals united, short, adherent to the belly.

Fresh waters of Japan.

1. **Tridentiger obscurus.**

Sicydium obscurum, *Schleg. Faun. Japon. Poiss.* p. 145. pl. 76. fig. 1.
Tridentiger obscurus, *Gill, l. c.*

D. 6 | 11. A. 10–11.

Anterior dorsal spines produced. Brown.

Japan.

ALPHABETICAL INDEX.

abbreviata (Cepola), 488.
abhortani (Amphacanthus), 313.
Acanthoclinidæ, 297.
Acanthoclinus, 297.
Acanthogobius, 4.
acanthopomus (Eleotris), 105.
acanthorhynchus (Callionymus), 485.
acanthorhynchus (Hemerocoetes), 485.
Acanthuroidei, 325.
Acanthurus, 325, 345.
Acarauna, 329.
Acharnes, 369.
Acharnina, 369.
achilles (Acanthurus),340.
Acronuridæ, 325.
Acronurus, 345.
aculeata (Rhynchobdella), 540.
aculeatum (Ophidium), 540.
aculeatus (Clinus), 282.
aculeatus (Lumpenus), 282.
aculeatus(Macrognathus), 540.
aculeatus (Stichæus), 282.
acuminatus (Clinus), 269, 562.
acutipinnis (Gobius), 44, 49.
acutus (Mugil), 410.
admirabilis (Callionymus), 144.
adustus (Mugil), 448.
ægyptius (Acronurus), 348.
æneo-fuscus (Gobius), 61.
æquipinnis (Blennius), 225.
æquipinnis(Salarias),253.
affinis (Atherina), 399.
affinis (Clinus), 285.
affinis (Gobius), 4.
affinis (Gunellus), 285.
affinis (Mugil), 433.
affinis (Ophiocephalus), 470.
afra (Atherina), 398.
Agonostoma, 461.
Agonostomus, 461.
Alauda cristata, 221.
albomaculatus (Gobius), 69.
albopunctata (Teuthis), 318.
albopunctatus (Amphacanthus), 318.
albopunctatus (Gobius), 25.
albula (Mugil), 410, 465.
alburnus (Atherinichthys), 404.
albus (Gobius), 80.
albus (Latrunculus), 80, 556.
alectrolophus (Centronotus), 289.
alectrolophus (Gunellus), 289.
alepidotum (Gobiosoma), 85.
alepidotus (Gobius), 85.
aleppensis (Mastacembelus), 541.
aleppensis (Rhynchobdella), 541.
algeriensis (Batrachus), 171.
aliala (Acanthurus), 339.
alticus (Salarias), 242.
altivelis (Acanthurus), 342.
altivelis (Callionymus), 147.
altivelis (Trachypterus), 303.
amarulus (Mugil), 449.
Amblyopina, 133.
Amblyopus, 133.
amblyrhynchus (Petroscirtes), 230.
amboinensis (Eleotris), 117.
amboinensis (Keris), 356.
amboinensis(Petroscirtes), 237.
amboinensis (Salarias), 244.
americanus (Blennius), 295.
americanus (Enchelyopus), 295.
americanus (Lophius),181
amiciensis (Gobius), 35.
amorea (Gobius), 122.
Amphacanthus, 313.
amphibius (Blennius),242
Amphisile, 524.
Anabas, 374.
anabatoides (Betta), 389.
Anarrhichas, 208.
Anarrhichthys, 211.
ancylodon (Petroscirtes), 235.
Andamia, 294.
anema (Petroscirtes), 236.
anginosus (Keris), 356.
anginosus (Priodon), 356.
Anguella, 394.
anguillaris (Amblyopus), 135.
anguillaris(Blennius),282, 296.
anguillaris (Clinus), 271.
anguillaris (Gobius), 74, 133.
anguillaris (Gunellus), 282.
anguillaris (Leptogunellus), 282.
anguillaris (Lumpenus), 282.
anguillaris (Stichæus), 282.
anguillaris (Zoarces), 296.
angusta (Malthea), 201.
anjerensis (Gobius), 6.
annularis (Acanthurus), 330.
annularis (Chænogobius), 65.
annularis (Gobius), 65.
annularis (Priodon), 352.

annulatus (Nascus), 352.
annulatus (Priodon), 352.
anolis (Petroscirtes), 238.
anolius (Blennechis), 238.
Anoplarchus, 564.
Antennarius, 183.
anticolus (Blennius), 217.
antinectes (Cristiceps), 273, 562.
Aphya, 58.
aphya (Gobius), 58.
apiatus (Batrachus), 559.
Apocryptes, 80.
Apodichthys, 290.
apogonius (Gobius), 28.
aporos (Eleotris), 109.
apos (Gunellus), 288.
apus (Centronotus), 288.
arabicus (Gobius), 74.
aral (Rhynchobdella), 540.
arcticus (Chironectes), 186.
arcticus (Gymnetrus), 305.
arcticus (Gymnogaster), 305.
arcticus (Trachypterus), 305.
arenarius (Gobius), 59.
arenatus (Salarias), 249.
argentatus (Blennius), 272.
argentatus (Clinus), 272.
argentatus (Cristiceps), 272, 562.
argentea (Teuthis), 322.
argenteus (Acanthurus), 346.
argenteus (Acronurus), 346.
argenteus (Amphacanthus), 322.
argenteus (Mugil), 424.
argentilineatus (Periophthalmus), 98.
argentinensis (Atherina), 405.
argentinensis (Atherinichthys), 405.
argus (Mastacembelus), 542.
argus (Ophiocephalus), 480.
argyrotæniata (Atherina), 392.
aristotelis (Bogmarus), 304.
armatus (Macrognathus), 542.
armatus (Mastacembelus), 542.
armiger (Acanthurus), 337.
artedii (Blennius), 223.
ascanii (Blenniops), 284.
ascanii (Blennius), 284.
ascanii (Gymnetrus), 311.
Aspidontus, 229, 231.
Aspisurus, 348.
aspro (Platyptera), 138.
Asterropteryx, 132.
Atherina, 392, 402.
Atherinichthys, 402.
Atherinidæ, 391.
Atherinina, 391.
Atherinoides, 402.
atherinoides (Gobius), 18.
Atherinopsis, 402.
atlanticus (Salarias), 242.
Auchenionchus, 261.
Auchenopterus, 275.
audifredi, 272.
Aulostoma, 535.
Aulostomatoidei, 529.
aurantiacus (Amphacanthus), 321.
aurantiacus (Ophiocephalus), 471.
auratus (Eleotris), 11.
auratus (Gobius), 11.
auratus (Mugil), 442.
auritus (Blennius), 215, 560.
aurosplendidus (Blennius), 212.
australis (Cristiceps), 275, 562.
australis (Teuthis), 327.
axillaris (Mugil), 444.
Axinurus, 348.

bacalaus (Gobius), 50.
Badis, 367.
badis (Labrus), 367.
badius (Euctenogobius), 79.
bahianus (Acanthurus), 325.
baikalensis (Callionymus), 299.
baikalensis (Comephorus), 299.
balbis (Lepadogaster), 511.
balinense (Sicydium), 96.
Balistes, 186.
baliuroides (Gobius), 42.
baliurus (Gobius), 18.
banana (Gobius), 59, 554.
Band-fish, 486.
bankanensis (Ophiocephalus), 475.
bankanensis (Petroscirtes), 237.
bankieri (Petroscirtes), 229.
banksii (Gymnetrus), 309.
banksii (Regalecus), 309.
barbarus (Gobius), 97.
barbatulus (Antennarius), 188.
barbatulus (Chironectes), 188.
barbatus (Liparis), 159.
barbatus (Lophius), 179.
barbatus (Petroscirtes), 238.
barbatus (Triænophorichthys), 90.
Barbero, 329.
barca (Ophiocephalus), 477.
bariene (Acanthurus), 338.
basalis (Eleotris), 114.
basalis (Ophiocephalus), 472.
Basilichthys, 402.
basiliscus (Blennius), 220.
bato (Apocryptes), 82.
bato (Gobius), 82.
Batrachidæ, 166.
batrachocephalus (Gobius), 51, 551.
Batrachoides, 166.
Batrachus, 166, 175, 179.
Bedula, 367.
bejeus, 387.
belanak (Mugil), 427.
belcheri (Callionymus), 148.
Belennus, 145.
belenus (Callionymus), 145.
Bellows-fish, 518.
bellus (Salarias), 256.
belobrancha (Eleotris), 127.
Belobranchus, 105, 127.
belosso (Gobius), 50.
belosso (Oxyurichthys), 50.
bennettii (Dactylopus), 152.
Benthophilus, 91.
berlandieri (Mugil), 410.
Betta, 388.
biaculeatus (Monoceros), 348.
biciliatus (Lepadogaster), 511.
bicolor (Gobius), 11, 52.
bicornis (Chironectes), 184.
bifilum (Blennius), 225, 561.
bigibbus (Antennarius), 199, 560.
bigibbus (Lophius), 199.
bilitonensis (Salarias), 257.

bimaculatus (Cyclopterus), 514.
bimaculatus (Gobiesox), 514.
bimaculatus (Gobius), 74.
bimaculatus (Lepadogaster), 514.
bimanensis (Atherina), 392.
biocellatus (Antennarius), 196.
biocellatus (Blennechis), 239.
biocellatus (Chironectes), 196.
biocellatus (Gobius), 20.
biocellatus (Petroscirtes), 239.
bipunctatus (Acanthurus), 331.
bipunctatus (Gobius), 76.
biseriatus (Salarias), 240.
bishopi (Gobius), 27.
bispinis (Batrachus), 166.
bitelatus (Gobius), 35.
blanchardii (Neoclinus), 259.
bleekeri (Acanthurus), 335.
bleekeri (Atherina), 398.
bleekeri (Mugil), 445.
bleekeri (Plesiops), 364.
Blennechis, 229.
Blenniidæ, 206.
Blennioclinus, 261.
Blenniops, 284.
Blennius, 211, 284.
Blennophis, 259.
Blenny (Purp'e), 286.
Blenny (Smooth), 226.
Blenny (Spotted), 286.
blochii (Acanthurus), 330, 344.
blokzeyli (Gobius), 5.
boddaertii (Boleophthalmus), 102, 103.
boddærtii (Eleotris), 102.
boddærtii (Gobius), 102.
bogmarus (Trachypterus), 305.
Boleophthalmus, 101.
bonapartii (Notacanthus), 545.
bonariensis (Atherina), 404.
bonariensis (Atherinichthys), 404.
bonellii (Trachypterus), 301.
Bontah, 410.
bontah (Mugil), 427.
bontii (Gobius), 41.
Bouches en flute, 529.
borbonicus (Mugil), 410, 437, 445.
borealis (Batrachus), 170.
borneensis (Apocryptes), 81.
borneensis (Gobius), 33.
borneensis (Mugil), 448.
borneensis (Periophthalmus), 100.
boscianus (Chasmodes), 229.
boscii (Atherina), 406.
boscii (Gobius), 85.
bosquianus (Blennius), 229.
Bostrichthys, 105, 127.
bothriocephalus (Gobius), 10.
bougainvillii (Antennarius), 199.
bougainvillii (Chironectes), 199.
Bouri, 417, 443.
Bouria, 417.
boyeri (Atherina), 394.
Brachionichthys, 182, 560.
brachycentron (Naseus), 349.
brachycephalus (Blennioclinus), 264.
brachycephalus (Clinus), 264.
brachygaster (Amblyopus), 134.
brachyptera (Atherina), 401.
brachypterus (Apocryptes), 80, 84.
brachysoma (Amblyopus), 136.
brachysoma (Mugil), 425.
brasiliensis (Atherina), 404.
brasiliensis (Atherinichthys), 404.
brasiliensis (Gobius), 6.
brasiliensis (Mugil), 431.
brea (Blennius), 215.
breviceps (Atherina), 395.
breviceps (Blennechis), 234.
breviceps (Evorthodus), 85.
breviceps (Gobius), 6.
breviceps (Mugil), 410.
breviceps (Petroscirtes), 234.
brevifilis (Gobius), 4.
brevipinnis (Blennius), 226.
brevirostris (Gobiesox), 494.
brevirostris (Gobius), 41.
brevirostris (Naseus), 349.
brevirostris (Teuthis), 318.
brevis (Acanthurus), 325.
brevispinis (Acronurus), 346.
brevispinis (Amphisile), 527.
britannicus (Gobius), 11.
britannicus (Mugil), 439.
brosme (Centronotus), 284
broussouetii (Amblyopus), 136.
broussonetii (Gobioides), 136.
broussonetii (Mugil), 435.
brownii (Lepadogaster), 510.
brunneus (Gobius), 65.
buccatus (Gobius), 14.
buchanani (Badis), 367.
buchanani (Mugil), 410.
budegassa, 180.
bufo (Blennius), 562.
bufo (Lophius), 167.
bufo (Pholis), 562.
Buhotte, 58.
Buosega, 454.
bürgeri (Dictyosoma), 564.
Butis, 105.
butis (Cheilodipterus), 116
butis (Eleotris), 116, 558.
bynoensis (Gobius), 70.

Cabot (Mulet-), 417.
cæculus (Amblyopus), 133.
cæruleo-lineatus (Plesiops), 363.
cæruleo-maculatus (Mugil), 445.
cæruleo-punctatus (Gobius), 70.
cæruleus (Acanthurus), 336.
cæruleus (Cyclopterus), 155.
cæruleus (Gobius), 5, 6.
cagnota (Blennius), 217.
calauropomus (Callionymus), 147.
californiensis (Atherinichthys), 406.
californiensis (Atherinopsis), 406.
Calliclinus, 261.
Callionymina, 138.

Callionymus, 138, 151.
callyodon (Cyclopterus), 162.
callyodon (Liparis), 162.
Campylodon, 544.
campylostomus (Boleophthalmus), 101.
canaliculata (Teuthis),316
canaliculatus (Amphacanthus), 316.
canaliculatus (Chætodon), 316.
canariensis (Clinus), 262.
candollii (Lepadogaster), 513.
canina (Eleotris), 124.
caninoides (Gobius), 36.
caninus (Gobius), 38.
Cannorhynchus, 529.
cantherius (Eleotris), 115.
cantonensis (Apocryptes), 98.
cantoris (Antennarius), 193.
cantoris (Eleotris), 107.
cantoris (Mugil), 430.
cantoris (Osphromenus), 384.
capellei, 312.
capensis (Blennius), 268.
capensis (Cirrhibarbis), 269.
capensis (Clinus), 269.
capensis (Gymnetrus),308
capensis (Mugil), 443.
capensis (Spirobranchus), 373, 564.
caperata (Eleotris), 117.
capillatus (Clinus), 262.
capillatus (Labrosomus), 262.
capistratus (Gobius), 36.
capito (Blennius), 215.
capito (Gobius), 55, 554.
capito (Mugil), 439, 455.
capito (Tripterygion),277.
Carida, 417.
carinatus (Acanthurus), 334.
carinatus (Mugil), 410.
carolina (Atherina), 392.
carolinarum (Aspisurus), 354.
carolinarum (Naseus),354.
carolinus (Pholis), 212.
cascasia (Mugil), 410.
caspia (Atherina), 392.
caspius (Gobius), 4.
castaneus (Salarias), 247.
catebus (Gobius), 21.
Cat-fish, 208.
Catopra, 368.
catulus (Gobius), 6, 549.
caudatus (Macrognathus), 541.
caudimaculatus (Antennarius), 197.
caudimaculatus (Chironectes), 192, 197.
cauerensis (Gobius), 41.
Caustello, 439.
cavernosus (Blennius),240
cavernosus (Salarias), 240.
Cebidichthys, 260.
Cefalo, 417.
Cefalo pietra, 454.
celatus (Batrachus), 167.
celebicus (Acanthurus), 339.
celebicus (Gobius), 21.
celebicus (Salarias), 250.
Centriscidæ, 518.
Centriscus, 518.
Centrogaster, 313.
Centronotus, 285.
cepedianus (Gymnetrus), 78.
cepedianus (Lophotes), 312.
cephalarges (Gobius), 4, 546.
cephalotus (Mugil), 419, 428.
cephalus (Gobiesox), 499, 566.
cephalus (Lepadogaster), 513.
cephalus (Mugil),417,439, 454, 455.
Cepola, 486.
Cepolidæ, 486.
ceramensis (Gobiodon),88
ceramensis (Gobius), 88.
ceramensis (Mugil), 449.
ceramensis (Salarias),246.
Ceratias, 205.
cervicornu (Blennius),212
Cestræus, 461.
ceylonensis (Mugil), 446.
Chænogobius, 4.
Chæturichthys, 3.
changua (Apocryptes), 81.
changua (Gobius), 80.
Channa, 483.
chaptalii (Mugil), 410.
Chasmodes, 228.
Chaunax, 200.
Chauve-souris de mer, 200
chelo (Mugil), 442, 454, 455.
chena (Ophiocephalus), 474.
chilensis (Conger), 294.
chilensis(Genypterus),294
chilensis (Gobiesox), 497.
chilensis (Sicyases), 497.
chilensis (Tomicodon),497
chilo (Gobius), 4.
chiloensis (Gobius), 5.
chinense (Aulostoma), 538.
chinense (Ophidium), 78.
chinensis (Apocryptes), 102.
chinensis (Aulostomus), 536, 538.
chinensis (Chætodon),379.
chinensis (Fistularia),536.
chinensis (Gobius), 37.
chinensis (Polyacanthus), 379.
chinensis (Solenostomus), 536.
Chironectes, 182, 183.
chironectes (Antennarius), 197.
chironectes (Lophius),197
chirurgus (Acanthurus), 329.
chirurgus (Chætodon), 329.
chlorostigma (Chironectes), 183.
chlorostigma (Gobius), 5.
chlorostigmatoides (Gobius), 39.
chordatus (Stylophorus), 306.
Chorisochismus, 490.
chrysosoma (Acanthurus), 332.
chrysospilos (Amphacanthus), 313.
chrysospilos (Periophthalmus), 100.
chrysospilos (Salarias), 250.
chuna, 387.
chupasangue (Lepadogaster), 313.
Cievolo, 417.
ciliatus (Blennius), 296.
ciliatus (Lepadogaster), 511.
ciliilabis (Myxus), 467.
cinereus (Blennius), 268.
Cirrhibarbis, 261.
cirrhostoma (Mugil), 459.
cirrhosum (Lepisoma), 262.
cithara (Callionymus), 144.
citrinus (Gobiodon), 87.

citrinus (Gobius), 87.
Clinus, 261, 272.
coalitus (Gobius), 548.
cobitis (Gobius), 6.
cobojius (Cojus), 375.
coccineus (Antennarius), 191.
coccineus (Chironectes), 191.
coccoi (Leptopterygius), 515.
Cochinchina Lophius,185
cocosensis (Gobius), 230.
cœcula (Cepola), 133.
cœcula (Tænioides), 135.
cœculus (Amblyopus),133.
Colisa, 387.
colisa (Trichopodus), 387.
colonianus (Gobius), 59.
coloratum (Aulostoma), 536.
Comephoridæ, 299.
Comephorus, 299.
commersonii (Antennarius), 192.
commersonii (Chironectes), 192.
commersonii (Fistularia), 533.
commersonii (Gobius), 6.
commersonii (Lophius), 192.
communis (Liparis), 161.
compressus (Mugil), 451.
concatenata (Teuthis), 316.
concatenatus (Ampbacanthus, 316.
concolor (Lentipes), 96.
conspicillum (Batrachus), 171.
constantiæ (Mugil), 418.
constructor (Gobius), 4.
conwayii (Hoplognathus), 357.
coquillad (Blennius), 284.
corallicola (Plesiops), 364.
corallina (Teuthis), 316.
corallinus (Amphacanthus), 316.
cora-mota (Ophiocephalus), 471.
cornifer (Blennius), 214.
corniger (Acronurus), 348.
cornubicus (Cyclopterus), 511.
cornubicus (Lophius),179.
cornubiensis (Lepadogaster), 511.
cornutus (Blennius), 213, 215.
cornutus(Macrorhamphosus), 519.
cornutus (Silurus), 519.
coronatus (Cyclopterus), 155.
corrugatus (Mugil), 454.
corsula (Mugil), 460.
coryphænula (Gobius),87.
Corystion, 140.
cotra, 387.
cottoides (Clinus), 269.
Cotylis, 497, 499.
couagga (Chætodon), 327.
Courpata, 408.
crassilabris (Gobius), 63.
crassispina (Gunellus),285
crenilabris (Mugil), 458.
Crepidogaster, 507.
criniger (Gobius), 29.
crinitus (Blennius), 224, 561.
crinitus (Clinus), 266.
crista galli (Anoplarchus), 564.
crista galli (Cebidichthys), 260.
crista galli (Centronotus), 289, 564.
crista galli (Gobius), 8.
cristatus (Adonis), 223.
cristatus (Blennius), 223.
cristatus (Myxodes), 261.
cristatus (Trachypterus), 301.
Cristiceps, 272.
cruentatus (Gobius), 54.
Cryptacanthodes, 291.
cryptocentrus(Batrachus), 166.
cryptocentrus (Gobius),71
cryptochilus (Mugil), 444.
Ctenodon, 280.
ctenodon (Acanthurus), 342.
Ctenogobius, 4.
Ctenopoma, 373, 565.
Ctenops, 384.
cubifrons (Malthe), 203.
Culius, 105, 125.
culius (Cheilodipterus), 125.
cunnesius (Mugil), 428, 434.
cupanus (Polyacanthus), 381.
Curema, 431.
curtus (Mugil), 439.
curvicornis(Callionymus), 145, 558.
curvidens (Mugil), 467.
curvidens (Myxus), 467.
cuvieri (Salarias), 248.
cuvieri (Tetragonurus), 408.
cyanoclavis (Gobius), 40.
cyanomos (Gobius), 39.
cyanospilos (Ophiocephalus), 474.
cyanostigma(Eleotriodes), 119.
cyanostigma(Eleotris),119
cyanostigma(Salarias),258
cyanotænia (Amphacanthus), 323.
cyanotænia (Gobius), 71.
Cyclogaster, 159.
cyclops (Salarias), 246.
Cyclopterus, 154.
cyclopterus (Gobius), 14.
cyclopus (Liparis), 163.
cylindricus (Mugil), 410.
cynocephalum(Sicydium), 94.
cynodon (Petroscirtes), 234.
cyprinoides (Blennechis), 235.
cyprinoides(Eleotris),118.
cyprinoides (Gobius), 8.
cyprinoides (Nestis), 462.
cyprinoides (Petroscirtes), 235.

Dactylopus, 151.
dactylopus (Callionymus), 152.
dactylopus (Vulsus), 152.
Dactyloscopus, 279, 560.
Dajaus, 461.
dama (Salarias), 241.
danius (Atherina), 105.
dario (Bades), 367.
dario (Labrus), 367.
Daurin, 442.
Deal-fish, 305.
decem-radiatus (Mugil), 452.
decussatus (Gobius), 69.
decussatus (Salarias), 240.
deissneri (Osphromenus), 381.
deissneri (Polyacanthus), 381.
delalandii (Clinus), 264.
delalandii(Malacoctenus), 264.
delisianus (Acanthurus), 340.
dentatus (Apocryptes), 81.
dentatus (Boleophthalmus), 101.
dentatus (Oxuderces),165.

dentex (Chorisochismus), 490.
dentex (Cyclopterus), 490.
dentex (Gobiesox), 490.
dentex(Lepadogaster),490
denticulatus (Anarrhichas), 211.
desfontainii (Lepadogaster), 514.
desjardinii (Acanthurus), 344.
despicillatus (Clinus),271.
Diablo, 200.
diadematum(Gobiosoma), 85.
diadematus (Gobius), 85.
Dictyosoma, 279.
didactylus (Batrachus), 170.
diemensis (Batrachus), 169.
diemensis (Dajaus), 465.
Diplocrepis, 506.
diproctopterus (Salarias), 254.
dipus (Periophthalmus), 98.
Discòboli, 154, 489.
dispar (Petroscirtes), 231.
dobula (Mugil), 420.
dobuloides (Agonostoma), 462.
dobuloides (Nestis), 462.
doliata (Teuthis), 323.
doliatus (Amphacanthus), 323.
doliatus (Siganus), 323.
dolichogaster (Blennius), 288.
dolichogaster (Centronotus), 288.
dolichogaster (Gunellus), 288.
doreensis (Acanthurus), 332.
dorehensis (Antennarius), 184.
dormitator (Gobiomorus), 119.
dormitator (Philypnus), 119, 558.
dormitator (Platycephalus), 119.
dormitatrix(Eleotris),119, 558.
dorsalis (Amphacanthus), 318.
dorsalis (Clinus), 271.
dorsalis (Teuthis), 318.
double-épine (Cyclopterus), 502.
Dracunculus, 144.
dracunculus (Callionymus), 139, 144.
Dragonet (Gemmeous), 140.
Dragonet (Sordid), 140.
dubius (Batrachus), 169.
dubius (Clinus), 272.
duodecimalis (Atherina), 400.
dussumieri (Acanthurus), 335.
dussumieri (Batrachus), 169.
dussumieri (Blennechis), 229.
dussumieri (Boleophthalmus), 104.
dussumieri (Mugil), 428, 449.
dussumieri (Salarias), 251, 562.

Ealpont, 295.
echinocephalus (Gobius), 34.
edentulus (Blennius). 252.
edentulus (Salarias), 252.
ehrenbergii (Gobius), 19.
einthovenii (Polyacanthus), 378.
ekströmii (Gobius), 57.
elegans (Aspisurus), 353.
elegans (Callionymus), 145.
elegans (Clinus), 261.
elegans (Gobius), 18.
Eleotriodes, 105, 130, 131.
eleotrioides (Gobius), 4.
Eleotris, 105.
eleotris (Gobius), 37.
elongatus (Acanthurus), 331.
elongatus (Chætodon), 331.
elongatus (Myxus), 466.
elongatus (Petroscirtes), 233.
emarginatus (Blennius), 224.
Enchelyopus, 295, 540.
endrachtensis (Atherina), 401.
engeli (Mugil), 430.
eoume (Prionurus), 354.
epalzeorhynchus (Salarias), 240.
eparai (Acanthurus), 337.
ephippiatus (Gobius), 4.
eruptionis (Amblyopus), 133.
erythrocephalus (Blennius), 215.
erythrophaios(Gobiodon), 87.
erythrophaios (Gobius), 87.
erythrotænia (Mastacembelus), 542.
Euctenogobius, 79.
euronotus (Mugil), 443.
europæus (Blennius), 286.
eurypterus (Lophius),179.
Evorthodus, 84.
exanthematosus (Gobius), 55, 554.
expansa (Andamia), 294.

fabricii (Campylodon), 544.
fabricii (Gunellus), 280.
fabricii (Liparis), 161.
fabricii (Lumpenus), 280.
falcipinnis (Mugil), 453.
falx (Trachypterus), 302.
fasciata (Catopra), 368.
fasciato-punctatus (Gobius), 22.
fasciatus (Blennechis), 239.
fasciatus (Blennius), 244.
fasciatus (Callionymus), 138.
fasciatus (Centronotus), 287, 564.
fasciatus (Clinus), 262.
fasciatus(Ctenogobius),34.
fasciatus (Gobius), 34.
fasciatus (Gunellus), 287, 564.
fasciatus (Harpurus), 327.
fasciatus (Hoplognathus), 357.
fasciatus (Mugil), 458.
fasciatus (Petroscirtes), 239.
fasciatus (Polyacanthus), 388.
fasciatus (Salarias), 244.
fasciatus (Scaradon), 357.
fasciatus (Sicyases), 497.
fasciatus (Trichogaster), 387.
fasciolatoceps (Blennius), 212.
fasciolatus (Blennechis), 229.
faujas (Lophius), 203.
felis (Anarrhichas), 211.
felis (Anarrhichthys), 211.
fenestratum (Tripterygium), 278.

fenestratus (Blennius), 278.
fergusonis (Lophius), 179.
fernandezianus (Clinus), 262.
ferrandi (Mugil), 424.
festivus (Callionymus), 144, 147.
filamentosus (Blennechis), 230.
filamentosus (Callionymus), 147.
filamentosus (Petroscirtes), 230.
filicornis (Blennius), 216.
filifer (Gobius), 73.
filosus (Gobius), 28.
Filzetta, 443.
fimbriata (Cotylis), 498.
fimbriatus (Zoarces), 296.
firmamentum, 313.
Fishing-Frog, 197.
fissicornis (Blennius), 225.
Fistularia, 529.
Fistularidæ, 518, 529.
fistularis (Flagellaria), 529.
flammans (Eleotris), 105.
flavescens (Acanthurus), 342.
flavescens (Platypterus), 138.
Flaveton, 443.
flavidus (Apodichthys), 290.
flavimanus (Acanthogobius), 76.
flavimanus (Gobius), 76.
flavo-guttatus (Acanthurus), 325.
flavo-umbrinus (Salarias), 241.
flavus (Gobius), 13.
fluviatilis (Gobius), 15, 551.
fontanesii (Gobius), 74.
fornasini (Eleotris), 123.
forskålii (Atherina), 397.
forsteri (Agonostoma), 465.
forsteri (Mugil), 465.
forsteri (Salarias), 252.
forsteri (Tripterygium), 278.
frater (Blennius), 212.
fraterculus (Acanthurus), 341.
frenatus (Gobius), 39.
frenatus (Salarias), 246.
freycineti (Periophthalmus), 100.
frontalis (Salarias), 245.
fronticornis (Naseus), 348.
fronticornis (Naso), 348.
fronto (Patæcus), 292.
fronto (Salarias), 255.
fucorum (Blennius), 217.
fuliginosus (Acanthurus), 330.
fuliginosus (Gobius), 4.
furcipilis (Chironectes), 184.
fusca (Eleotris), 125, 558.
fusca (Pœcilia), 125.
fuscatus (Periophthalmus), 96.
fuscescens (Amphacanthus), 318, 321.
fuscescens (Centrogaster), 321.
fuscescens (Teuthis), 321.
fuscus (Acanthoclinus), 298.
fuscus (Acanthurus), 339.
fuscus (Acronurus), 330.
fuscus (Gobius), 26.
fuscus (Ophiocephalus), 471.
fuscus (Salarias), 245.
fusiformis (Gobius), 22.

gachua (Ophiocephalus), 471.
gahhm (Chætodon), 338.
gahm (Acanthurus), 338.
Galerita, 221.
galerita (Blenniops), 284.
galerita (Blennius), 212, 222, 284, 561.
gangene (Batrachoides), 168.
gastrospilus (Gobius), 43.
gattorugine (Blennius), 212, 244.
gelatinosus (Cyclopterus), 163.
gelatinosus (Liparis), 163.
geminatus (Blennius), 228.
gemmatus (Acanthurus), 343.
geniguttatus (Calliclinus), 265.
geniguttatus (Clinus), 265.
geniporus (Gobius), 55.
genivittatus (Gobius), 13.
gentilis (Blennius), 217.
Genypterus, 294.
geographicus (Lophius), 187.
gibbifrons (Salarias), 251.
gibbosus (Cyclopterus), 155.
gibbus (Chironectes), 187.
gibbus (Lophius), 187.
giuris (Gobius), 21, 31.
gladius (Cepola), 308.
gladius (Gymnetrus), 308.
gladius (Regalecus), 308.
glaucopareius (Acanthurus), 339.
glesne, 309, 310, 311.
glesne (Ophidium), 310.
glesne (Regalecus), 311.
glyphidodon (Apocryptes), 84.
Gobiesocidæ, 489.
Gobiesox, 490, 499.
Gobiidæ, 1.
Gobiina, 3.
Gobio, 159.
gobio (Clinus), 267.
gobio (Gobioclinus), 267.
Gobioclinus, 261.
Gobiodon, 87.
Gobioides, 133.
gobioides (Blennius), 242.
gobioides (Eleotris), 114.
Gobionellus, 3.
Gobiosoma, 85.
Gobius, 3.
gobius (Liparis), 161.
Goby, Black, 11.
Goby, Spotted, 58.
goesii (Salarias), 253.
goldmanni (Gobius), 5.
goramensis (Acanthurus), 343.
goramensis (Callionymus), 149.
Goramy, 382, 566.
goreensis (Blennius), 212.
Gonania, 515.
gouanii (Lepadogaster), 510.
gourami (Osphronemus), 382.
gozo (Gobius), 11.
gracilis (Amblyopus), 134.
gracilis (Atherinichthys), 405.
gracilis (Blennius), 281.
gracilis (Centriscus), 521.
gracilis (Gobius), 54, 59, 78.
gracilis (Lepidogobius), 78.
gracilis (Lumpenus), 281.
grammepomus (Gobius), 64, 554.
grammistes (Blennechis), 236.
grammistes (Petroscirtes), 236.

grammoptilus (Acanthurus), 335.
grandicornis (Blennius), 213.
grandinosus (Gobius), 38.
grandinosus (Ophiocephalus), 478.
grandisquama (Eleotris), 113.
grandisquamis (Mugil), 410.
graphicus (Blennius), 221.
grillii (Gymnetrus), 311.
grillii (Regalecus), 311.
groenlandicus (Gunellus), 287, 288.
gronovii (Batrachus), 166.
gronovii (Zoarces), 295.
grootii (Catopra), 369.
grunniens (Batrachus), 168, 169.
grunniens (Cottus), 168.
gryphurus (Trachypterus), 301.
Guacucuja, 200.
guacucuja (Malthea), 201.
guamensis (Amphacanthus), 313.
guamensis (Gobius), 5.
Guaperva, 188, 200.
Guaperva sinensis, 186.
guavina (Eleotris), 124.
Guffer, 295.
gulosus (Gobius), 6, 546.
Gunellichthys, 280.
gunelliformis (Centronotus), 288.
Gunellus, 280, 285.
gunellus (Blennius), 285, 287, 288, 564.
gunellus (Centronotus), 285, 286, 564.
gunellus (Pholis), 286.
guttata (Murænoides), 286.
guttata (Teuthis), 320.
guttatus (Acanthurus), 329, 333.
guttatus (Amphacanthus), 318, 320.
guttatus (Chætodon), 320.
guttatus (Gobius), 3.
guttatus (Harpurus), 329.
guttatus (Luciogobius), 152.
guttatus (Salarias), 240, 250.
guttulatus (Clinus), 266.
gutum (Gobius), 6.
gymnauchen (Gobius), 43.
gymnauchen (Sicydium), 95.
Gymnetridæ, 300.
Gymnetrus, 307.
gymnocephalus (Gobius), 75.
gymnopareius (Amphacanthus), 321.
gymnopomus (Eleotris), 105.
gymnopomus (Gobius), 65.
gymnotrachelus (Gobius), 552.
gyrinoides (Eleotris), 123.
gyrinus (Eleotris), 122, 558.
gyrinus (Gobiesox), 490.

hæmatochilus (Mugil), 422.
Halieutæa, 203.
hamiltonii (Betula), 368.
hamiltonii (Macrognathus), 543.
Harder, 423.
harengus (Myxus), 467.
Harpurus, 327.
harpurus (Acanthurus), 353.
hasseltii (Eleotris), 116.
hasseltii (Gobius), 94.
hasseltii (Polyacanthus), 378.
hasseltii (Salarias), 258.
hasta (Gobius), 78.
hastatus (Gobionellus), 6, 546.
hawkenii (Gymnetrus), 309.
helfrichii (Polyacanthus), 379.
Helostoma, 377.
helsdingenii (Eleotris), 131.
Hemerocoetes, 485.
hemigymnopomus (Gobius), 20.
hendricksii (Salarias), 252.
henlei (Apocryptes), 83.
hentzii (Blennius), 212.
Hepatus, 315, 329.
hepatus (Acanthurus), 341.
hepatus (Teuthis), 341.
hypsetoides (Atherina), 397.
hypsetus (Atherina), 392, 393, 394, 396, 397.
hermanniana (Cepola), 135.
hermannianus (Amblyopus), 133, 135.
hermannianus (Tænioides), 135.
herminieri (Blennius), 264.
herminieri (Clinus), 264.
herminieri (Labrosomus), 264.
heterochilus (Mugil), 457.
heterodon (Clinus), 270.
heteroptera (Eleotris), 132.
heteropterus (Eleotriodes), 132.
heteropterus (Salarias), 240.
heterospilos (Gobiodon), 88.
Heterostichus, 261.
hexacanthus (Naseus), 355.
hexacanthus (Priodon), 355.
hexagonata (Teuthis), 320.
hexagonatus (Amphacanthus), 320.
hexagrammus (Stichæus), 284.
hexanema (Chæturichthys), 77.
hexanema (Gobius), 77.
heyligeri (Petroscirtes), 237.
hindsii (Callionymus), 146.
hirsutus (Brachionichthys), 182, 560.
hirsutus (Chironectes), 182.
hirsutus (Lophius), 182.
hirudo (Acanthurus), 327.
hispidus (Antennarius), 189.
hispidus (Chironectes), 189.
hispidus (Lophius), 189.
histrio (Antennarius), 188.
histrio (Chironectes), 188.
histrio (Gobiodon), 88.
histrio (Gobius), 88.
histrio (Lophius), 186, 187, 188, 190, 196, 201.
hoedtii (Eleotris), 110.
hoedtii (Malacanthus), 361
hoedtii (Naseus), 349.
hoevenii (Gobius), 32.
holbölli (Ceratias), 205.
Hoplegnathidæ, 357.
Hoplegnathus, 357.
horridus (Antennarius), 193.
Hrognkelsi, 155.
huguenii (Callionymus), 145.
humboldti (Atherinichthys), 404.

humboldtiana (Atherina), 404.
humeralis (Acanthurus), 337.
humeralis (Eleotris), 116.
humerosus (Centriscus), 522.
hungta (Cepola), 488.
hypselopterus (Acanthurus), 344.
hypselopterus (Mugil), 450.
hypselopterus (Petroscirtes), 237.

Ichthyocoris, 561.
ignobilis (Blennius), 268.
immaculata (Fistularia), 533.
immaculatus (Cannorhynchus), 533.
inæqualis (Blennius), 211, 223.
incilis, 431.
incisa (Atherina), 405.
incisa (Atherinichthys), 405.
indica (Channa), 483.
indicus (Ophiocephalus), 469, 470.
Ingely, 541.
ingens (Gunellus), 286.
interruptus (Salarias), 250
interstinctus (Gobius), 21.
iris (Cepola), 303.
iris (Ophiocephalus), 469.
iris (Trachypterus), 303.
irretitus (Mugil), 464.
islandicus (Blennius), 281.
islandicus (Bogmarus), 305.
islandicus (Centronotus), 281.
islandicus (Gunellus), 281.
islandicus (Stichæus), 281.
islandicus (Vogmarus), 305.

jacksoniana (Atherina), 402.
jacksoniana (Atherinichthys), 402.
janthinopterus (Gobius), 4.
japonica (Atherina), 398.
japonicus (Callionymus), 145, 148.
japonicus (Mugil), 419.
javanicus (Gobius). 33.
javus (Amphacanthus), 315.
javus (Teuthis), 315.
jovis (Ophiocephalus), 469.
jozo (Gobius), 12, 547.
Jura-sucker, 510.
jussieui (Lepadogaster), 513.

kallopterus (Periophthalmus), 98.
kallosoma (Petroscirtes), 233.
kalolo (Periophthalmus), 97.
karrak (Anarrhichas), 208.
karrouvei (Ophiocephalus), 469.
kelaartii (Mugil), 429.
kelaartii (Ophiocephalus), 472.
Keris, 355.
kessleri (Gobius), 553.
ketlitzii (Acanthurus), 325.
King of the Herrings, 310.
kingii (Salarias), 240.
knerii (Gobius), 549.
Knorhaen, 168.
knutteli (Gobius), 73.
koelreuteri (Gobius), 97.
koelreuteri (Periophthalmus), 97, 557.
koilomatodon (Eleotris), 117.
kokius, 21, 31.
koku, 21.
kopsii (Ampbacanthus), 313.
kora (Gobius), 21.
Kora-motta, 471.
Korah-motta, 21.
krusensternii (Cepola), 488.
kuhlii (Gobius), 4.
kuhlii (Polyacanthus), 378
kuhlii (Salarias), 239.
Kunnesee, 434.
kurpah (Gobius), 21.

labeo (Mugil), 453.
labiosus (Mugil), 454.
Labrosomus, 261.
labrosus (Blennius), 296.
labrosus (Mugil), 454.
labrosus (Zoarces), 296.
Labyrinthibranchii, 372, 468.
Labyrinthici, 372, 468.
labyrinthodes (Amphacanthus), 317.
labyrinthodes (Teuthis), 317.
lacepedii (Amblyopus), 133.
lacepedii (Antennarius), 190.
lacepedii (Gymnetrus), 302.
lacerta (Callionymus), 144
lacteus (Gobius), 552.
lacunosa (Atherina), 399, 400.
lacustris (Atherina), 394.
lævigatus (Chironectes), 185, 187.
lævis (Brachionichthys), 182.
lævis (Chironectes), 182.
lævis (Lophius), 182.
lævis (Pholis), 226, 227.
lagocephalus (Gobius), 92.
lagocephalum (Sicydium), 92, 94.
lalius (Colisa), 387.
lalius (Trichogaster), 387.
lamarrii (Acanthurus), 331
lampetræformis (Blennius), 281.
lanceolata (Eleotris), 80.
lanceolatus (Apocryptes), 80, 81.
lanceolatus (Gobius), 50.
lanceolatus (Regalecus), 78.
laokus (Boleophthalmus), 101.
Latargus, 208.
lateralis (Callionymus), 149.
lateralis (Eleotris), 122.
lateralis (Philypnus), 122.
laticeps (Sicydium), 93.
laticlavia (Atherina), 402.
laticlavia (Atherinichthys), 402.
laticlavius (Prionurus), 347.
latipinnis (Clinus), 267.
latipinnis (Ophthalmolophus), 267.
latirostris (Lepadogaster), 510.
latovittatus (Labrus), 360.
latovittatus (Malacanthus), 360.
latovittatus (Tænianotus), 360.
Latrunculus, 80.
Lattarina, 394.
latus (Ophiocephalus), 469
lauvergnii (Mugil), 410.
Lavaronus, 393, 394.
leerii (Trichopus), 384.

leiopterus (Trachypterus), 304.
Lembus, 105.
lembus (Eleotris), 121.
lentiginosus (Gobius), 20.
Lentipes, 96.
leopardinus (Gobius),547.
leopardus (Anarrhichas), 208.
Lepadogaster, 510.
lepadogaster (Cyclopterus), 511.
Lepidogobius, 4.
lepidus (Blennius), 221, 561.
lepidus (Gobius), 78.
leprosus (Antennarius), 198.
leprosus (Chironectes), 195.
Leptopterygius, 515.
lepus (Blennius), 222.
Lepus marinus, 155.
lessouii (Atherina), 402.
lessonii (Nemophis), 296.
lesueurii (Gobius), 12.
leuciscus (Eleotris), 118.
leucopunctatus (Ophiocephalus), 469.
leucosoma (Antennarius), 195.
leucosternon (Acanthurus), 340.
leucotænia (Pholidichthys), 293.
limbata (Cepola), 489.
limbatus (Gobius), 3.
limbatus(Ophiocephalus), 471.
lindgreeni (Antennarius), 192.
linearis (Gobius), 86.
lineata (Teuthis), 322.
lineatus (Acanthurus), 333.
lineatus (Amphacanthus), 322.
lineatus (Blennius), 212.
lineatus (Chætodon), 333.
lineatus (Cyclopterus),159
lineatus (Gobius), 15.
lineatus (Lepadogaster), 514.
lineatus (Liparis), 159.
lineatus (Mugil), 417.
lineatus (Saccarius), 183.
lineatus (Salarias), 254.
lineolatus (Acanthurus), 336.
lineolatus (Callionymus), 149.
liopterus (Trachypterus), 304.
Liparidina, 158.
Liparis, 158.
liparis (Cyclopterus), 159.
liparoides (Cyclopterus), 161.
littoreus (Acanthoclinus), 298.
littoreus (Blennius), 298.
littoreus (Clinus), 298.
littoreus (Cyclopterus), 509.
littoreus (Gobiesox), 509.
litturatus (Gobius), 554.
lituratus (Acanthurus), 353.
lituratus (Aspisurus), 354.
lituratus (Harpurus), 353.
lituratus (Naseus), 353.
Lisa, 454.
liza (Mugil), 420, 423.
longecaudatus (Callionymus), 148, 558.
longeradiatus (Gobius),12
longeradiatus (Gymnetrus), 308.
longicauda (Cepola), 487.
longicornis (Naseus), 348.
longimanus (Mugil), 428.
longipinnis (Eleotris),105.
longirostris (Malthea),201
Lophius, 178.
Lophotes, 312.
lophotes (Chironectes), 189.
Lophotidæ, 312.
lota (Gobius), 54.
Lotregano, 442.
Luciocephalidæ, 390.
Luciocephalus, 390.
Luciogobius, 152.
lucius (Ophiocephalus), 475.
lugens (Gobius), 4.
Lumpen, 295.
Lumpenus, 280.
lumpenus (Blennius), 280.
lumpenus (Centronotus), 281.
lumpenus (Clinus), 280.
lumpenus (Stichæus), 280.
Lump-sucker, 155.
Lump-sucker (Unctuous), 159.
Lumpus, 155.
lumpus (Cyclopterus),155
lunatus (Callionymus), 146.
lupulus (Blennius), 225.
lupus (Anarrhichas). 208.
Lupus marinus, 208.
lurida (Teuthis), 321.
luridus (Amphacanthus), 321.
lyra (Callionymus), 139, 144, 145.
lyra (Uranoscopus), 140.
lyricus (Gobius), 550.

macrocephalus (Anabas), 376.
macrocephalus (Benthophilus), 91, 556.
macrocephalus (Clinus), 266.
macrocephalus (Culius), 126.
macrocephalus (Gobius), 91.
macrocephalus(Gunellus), 285.
macrocephalus (Hexacanthus), 91.
macrochilus (Mugil), 458.
macrodon (Eleotris), 129.
macrognathos (Gobiosoma), 86.
macrognathos (Gobius), 86.
Macrognathus, 540.
macrolepidota (Eleotris), 111.
macrolepidota (Sciæna), 111.
macrolepidotus (Mugil), 419, 436.
macrolepis (Apocryptes), 83.
macrolepis (Mugil), 447, 449.
macrophthalma (Atherina), 404.
macrophthalmus (Gobiesox), 502.
Macropodus, 381.
macrops (Mugil), 428.
macropterus (Gobius), 4.
macropteryx (Blennius), 224.
Macropus, 381.
macrostetholepis (Sicydium), 94.
macrostoma (Gobius),548.
macrostomus (Gobiopsis), 548.
macrurus (Gobius), 48.
maculata (Eleotris), 112.
maculata (Rhynchobdella), 543.
maculatum (Aulostoma), 536.

maculatus (Anarrhichas), 208.
maculatus (Bostrychus), 480.
maculatus (Callionymus), 144.
maculatus (Clinus), 281.
maculatus (Cryptacanthodes), 291.
maculatus (Ctenodon), 281.
maculatus (Epidesmus), 303.
maculatus (Lembus), 121.
maculatus(Lepadogaster), 514.
maculatus (Mastacembelus), 543.
maculatus (Ophiocephalus), 480.
maculatus (Patæcus), 292.
maculatus (Regalecus), 304.
maculatus(Stichæus),281.
maculosa (Thalassophryne), 175.
maculosus (Amphacanthus), 321.
maculosus (Hoplognathus), 358.
madagascariensis (Eleotris), 111.
madeirensis (Mugil), 442.
maderensis (Gobius), 57.
madurensis (Apocryptes), 84.
mæandricus (Gobiesox), 505.
mæandricus (Lepadogaster), 505.
Malacanthidæ, 359.
Malacanthus, 359.
Malacoctenus, 261.
Malthe, 200.
Malthea, 200.
marcgravii (Aulastoma), 529.
margaritacea (Eleotris), 107.
margaritatus (Batrachus), 176.
margaritifera (Teuthis), 317.
margaritiferus (Amphacanthus), 317, 318.
margariturus (Gobius), 47.
marginata (Cepola), 489.
marginatus (Acanthurus), 333.
marginatus (Naseus), 352.
marginatus (Ophiocephalus), 471.
marmorata (Atherina), 393.
marmorata (Cotylis), 304.
marmorata (Eleotris),123.
marmorata (Teuthis),322.
marmoratus (Amphacanthus), 322.
marmoratus (Antennarius), 185.
marmoratus (Blennius), 248.
marmoratus (Callionymus), 150.
marmoratus (Chironectes), 187.
marmoratus (Gobiesox), 304.
marmoratus(Gobius),546, 550.
marmoratus (Lophius), 184.
marmoratus (Mastacembelus), 543.
marmoratus (Nandus), 367.
marmoratus (Salarias), 248, 562.
marmoratus(Sicyogaster), 502, 504.
Marsio, 58.
martensii (Gobius), 15.
martinica (Atherina), 395.
martinicus (Gobius), 60.
marulioides (Ophiocephalus), 479.
marulius (Ophiocephalus), 478.
Mastacembelidæ, 539.
Mastacembelus, 539, 540.
mastacembelus (Ophidium), 541.
mata (Acanthurus), 331, 335.
matoides (Acanthurus), 330.
mauritianus (Eleotris), 125.
mayenna (Amblyopus), 135.
mediterraneus (Notacanthus), 545.
medium (Tripterygium), 278.
medius (Clinus), 281.
medius (Lumpenus), 281.
medius (Stichæus), 281.
melancranus (Mugil),410.
melanio (Blennius), 561.
melanio (Gobius), 553.
melanocephalum (Tripterygium), 277.
melanocephalus (Gobius), 64.
melanocephalus(Salarias), 255.
melanochir (Mugil), 436.
melanopterus (Eleotris), 116.
melanopterus (Ophiocephalus), 473.
melanopus (Gobius), 6.
melanosoma (Culius),126.
melanosoma (Eleotris), 126.
melanosoma (Gobius), 42.
melanosoma (Ophiocephalus), 473.
melanospilos (Amphacanthus), 313.
melanostigma (Eleotris), 117.
melanostigma (Gobius), 5.
melanostoma (Gobius),53, 554.
melanotopterus (Callionymus), 139.
melanurum (Tripterygium), 277.
melanurus (Acanthurus), 346.
melanurus (Acronurus), 346.
melanurus (Eleotris), 105.
melanurus (Gobius), 33.
melas (Acanthurus), 345.
melas (Antennarius), 194.
melas (Plesiops), 363.
melasoma, 473.
meleagris (Salarias), 256.
melinopterus (Mugil),452
menidia (Atherina), 406.
menidia (Atherinichthys), 406.
meutum (Trichopodus), 382.
mentzelii (Chironectes), 184.
mertensii (Amphacanthus), 313.
mertensii (Gobius), 5.
mesoprion (Cepola), 488.
Meuille blanc, 439.
mexicanus (Gobius), 61.
microcephalum (Sicydium), 95.
microcephalus (Anabas), 377.
microcephalus (Trypauchen), 137.
microcirrhis (Clinus),266.

microlepidota (Atherinichthys), 403.
microlepidotum (Ctenopoma), 565.
microlepidotus (Basilichthys), 403.
microlepidotus (Prionurus), 347.
microlepis (Eleotriodes), 132.
microlepis (Eleotris), 132.
microlepis (Gobius), 49.
microlepis (Osphromenus), 385.
microlepis (Oxyurichthys), 49.
micropeltes (Ophiocephalus), 482.
microphthalmus (Gobius), 550.
microps (Agonostoma), 462.
micropus (Gobiodon), 89.
micropterygius (Uranoscopus), 140.
microstoma (Atherina), 401.
micrurum (Sicydium), 93.
miliaris (Ophiocephalus), 469.
minor (Anarrhichas), 208.
minuta (Atherina), 393.
minuta (Eleotris), 58.
minutus (Blennius), 215.
minutus (Cyclopterus), 155.
minutus (Gobius), 57, 58, 76, 155, 554.
minutus (Lepadogaster), 155.
mirbeli (Lepadogaster), 514.
mitratus (Blennechis), 237.
mitratus (Petroscirtes), 237
mocho (Atherina), 396.
modestus (Gobius), 5.
modestus (Periophthalmus), 98.
mogurnda (Eleotris), 111.
molestum (Gobiosoma), 556.
mollis (Batrachus), 187.
moluccensis (Antennarius), 191.
Monoceros, 348.
monoceros (Harpurus), 348.
Monocirrhus, 371.
monophthalmus (Auchenopterus), 275.
monopterygius (Callionymus), 485.
montacuti (Cyclopterus), 161.
montagui (Blennius), 222, 561.
montagui (Cyclopterus), 161.
montagui (Liparis), 161.
montanus (Ophiocephalus), 471.
monticola (Agonostoma), 464.
monticola (Dajaus), 464.
monticola (Mugil), 464.
morrissonii (Callionymus), 147.
mucosum (Xiphidion), 291.
mucosus (Liparis), 165, 559.
mucronatum (Ophidium), 285.
mucronatus (Gunellus), 285.
Mugil, 409.
Mugilidæ, 409.
Mugiloidei, 409.
müllerianus (Gymnetrus), 301.
Mullet, 439.
multifilis (Blennius), 562.
multilineatus (Mugil), 443.
multiocellatus (Antennarius), 194.
multiocellatus (Chironectes), 194.
multispine (Ctenopoma), 373.
murænoides (Blennius), 286.
murænoides (Centronotus), 286.
murænoides (Gunellus), 287.
muralis (Eleotriodes), 130.
muralis (Eleotris), 130.
muralis (Valenciennea), 130.
muricatus (Lophius), 203.
musculus (Cyclopterus), 159.
Musei britannici, 193.
mustela (Blennius), 268.
mustelaris (Blennius), 268
mutabilis (Clinus), 272.
mycterizans (Blennius), 268.
mystacinus (Gobius), 48.
mystax (Ophiocephalus), 473.
Myxodagnus, 563.
Myxodes, 260.
Myxus, 466.

Nandidæ, 362.
Nandina, 367.
nandoides (Catopra), 368.
Nandus, 367.
nandus (Coius), 367.
Naseus, 347.
Naso, 348.
nasus (Acanthurus), 353.
nasus (Notacanthus), 544.
nasus (Tripterygion), 276.
nasuta (Malthea), 201.
nasutum (Agonostoma), 463.
nasutus (Cristiceps), 273.
nebulo-punctatus (Gobius), 25, 26.
nebulosa (Bedula), 368.
nebulosa (Teuthis), 321.
nebulosus (Amphacanthus), 321.
nebulosus (Centronotus), 287.
nebulosus (Clinus), 281.
nebulosus (Gobius), 12, 29.
nebulosus (Gunellus), 287.
nebulosus (Lumpenus), 281.
nebulosus (Nandus), 368.
nematopterus (Clinus), 270.
Nemophis, 296.
Neoclinus, 559.
nepalensis (Mugil), 424.
nesogallicus (Antennarius), 187.
nesogallicus (Chironectes), 187.
Nestis, 461.
newberrii (Gobius), 77.
newberrii (Lepidogobius), 77.
nexipinnis (Apocryptes), 83.
niger (Culius), 125.
niger (Gobius), 6, 11, 57, 76, 547.
niger (Mugil), 408.
niger (Salarias), 240.
nigra (Eleotris), 125.
nigrans (Atherina), 406.
nigrans (Atherinichthys), 406.
nigrescens (Chætodon), 336.

nigri (Gobius), 27.
nigricans (Acanthurus), 329, 330, 331.
nigricans (Atherina), 403.
nigricans (Atherinichthys), 403.
nigricans (Chætodon), 329, 336.
nigricans (Entomacrodus), 254.
nigricans (Genypterus), 294.
nigricans (Harpurus), 339.
nigricans (Ophiocephalus), 477.
nigricans (Pharopteryx), 363.
nigricans (Plesiops), 363.
nigricans (Salarias), 254.
nigripinne (Tripterygium), 277.
nigripinnis (Gobiesox), 502.
nigripinnis (Gobius), 5.
nigro-fuscus (Acanthurus), 331.
nigro-fuscus (Chætodon), 331.
nigroris, 332.
nigros (Acanthurus), 332.
nigro-strigatus (Mugil), 457.
nigro-vittatus (Salarias), 245.
nilssonii (Gobiosoma), 86.
nilssonii (Gobius), 86.
Niqui, 176.
niqui (Callionymus), 166.
nitidus (Antennarius), 187.
nitidus (Salarias), 243.
niveatus (Gobius), 71.
nobilis (Ctenops), 384.
Notacanthi, 539, 544.
Notacanthus, 544.
notacanthus (Gobius), 35, 549.
notata (Atherina), 406.
notata (Atherinichthys), 406.
notata (Malthea), 201.
notatus (Porichthys), 176.
notophthalmus (Antennarius), 196.
notosticta (Teuthis), 320.
notostictus (Amphacanthus), 320.
novem-lineatus (Chasmodes), 229.
novem-lineatus (Pholis), 229.
novem-radiatus (Gobius), 100.
nox (Gobius), 28.
nubilus (Lumpenus), 564.
nubilus (Stichæus), 564.
nuchalis (Amphacanthus), 320.
nuchifilis (Blennius), 223.
nuchipinnis (Clinus), 262.
nuda (Cotylis), 502.
nudiceps (Gobius), 13.
nudus (Chorisochismus), 490.
nudus (Cyclopterus), 502.
nudus (Gobiesox), 490, 502.
nudus (Lepadogaster), 502.
nummifer (Acanthurus), 338.
nummifer (Antennarius), 195.
nummifer (Chironectes), 195.

Oar-fish, 309.
oblongus (Gobius), 136.
oblongus (Sparus), 359.
obscura (Eleotris), 115.
obscurum (Sicyd.), 566.
obscurus (Gobius), 17.
obscurus (Ophioc.), 476.
obscurus (Trident.), 566.
oceanicus (Blennius), 212.
ocellaris (Blennius), 222.
ocellaris (Gobius), 64.
ocellata (Rhynchobdella), 540.
ocellatum (Ophidium), 288
ocellatus (Anarrhichthys), 211.
ocellatus (Antennarius), 196.
ocellatus (Bostrichoides), 468.
ocellatus (Callionymus), 150.
ocellatus (Chironectes), 196.
ocellatus (Cyclopterus), 511.
ocellatus (Lepadogaster), 514.
ocellatus (Macrognathus), 540.
ocellatus (Macropodus), 379.
ocellatus (Myxodes), 260.
ocellatus (Ophiocephalus), 468.
ocellicauda (Philypnus), 128.
octoradiatus (Mugil), 437.
olfax (Osphr.), 382, 566.
oligacanthum (Helostoma), 377.
oligolepis (Anabas), 376.
oligolepis (Gobius), 14.
oligolepis (Mugil), 449.
oligospilos (Antennarius), 198.
olivaceus (Acanthurus), 336.
olivaceus (Amphacanthus), 313.
olivaceus (Chætodon), 352.
olivaceus (Gobius), 4.
olivaceus (Lepadogaster), 513.
olivaceus (Naseus), 352.
olivaceus (Salarias), 240.
ommaturus (Gobius), 77.
Omobranchus, 229.
Oncotion, 155.
oortii (Salarias), 257.
opercularioides, 151.
opercularis (Callionymus), 151.
opercularis (Labrus), 379.
opercularis (Myxodagnus), 563.
opercularis (Polyacanthus), 379.
ophicephalum (Gobiosoma), 86.
ophicephalus (Gobius), 86.
Ophioblennius, 259.
Ophiocephalidæ, 468.
Ophiocephaloidei, 468.
Ophiocephalus, 468.
ophiocephalus (Eleotris), 107.
ophiocephalus (Gobius), 54, 554.
Ophthalmolophus, 261.
ophthalmonema (Gobius), 48.
ophthalmonema (Oxyurichthys), 48.
ophthalmoporus (Gobius), 17.
ophthalmotænia (Gobius), 37.
ophuysenii (Mugil), 434.
Oplognathus, 357.
Oplopomus, 549.
oplopomus (Gobius), 15.
oramin (Teuthis), 318.
orbicularis (Acanthurus), 346.

orbicularis (Acronurus), 346.
orbis (Cyclopterus), 158.
orientalis (Callionymus), 139.
orientalis (Channa), 483, 566.
orientalis (Rhynchobdella), 540.
ornatus (Blennechis), 239.
ornatus (Gobius), 21.
ornatus (Gunellus), 287.
oryx (Salarias), 241.
Osphromenoidei, 372.
Osphromenus, 382.
öur (Mugil), 419.
ovoviviparus (Blennius), 295.
Oxuderces, 165.
Oxudercidæ, 165.
oxycephala (Eleotris), 115.
oxycephalus (Plesiops), 364.
Oxymetopon, 153.
oxypterus (Gobius), 34.
oxyrhynchum (Agonostoma), 461.
oxyrhynchus (Cestræus), 461.
Oxyurichthys, 3, 48, 49

pacifica (Cobitis), 125.
pacifici (Batrachus), 173.
padangensis (Gobius), 25.
paganellus (Gobius), 52, 55, 553.
pallasii (Trichopus), 384.
pallidus (Gobius), 5.
palmicornis (Blennius), 218, 284.
paludosus (Polyacanthus), 379.
paucalus, 541.
panizzæ (Gobius), 16.
pantherinus (Anarrhichas), 208.
pantherinus (Blennius), 219.
papilio (Blennius), 222.
papilio (Gobius), 5.
papilio (Periophthalmus), 99.
papuensis (Gobius), 49.
paradiseus (Petroscirtes), 230.
paradoxus (Gobius), 549.
paradoxus (Psychrolutes), 516.
Parati, 423.
pardalis (Antennarius), 198
pardalis (Chironectes), 198
parmatus (Mugil), 410.
parsia (Mugil), 426, 444, 452.
paroticus (Harpurus), 337
parvei (Sicydium), 94.
parvicornis (Blennius), 218.
parvidens (Pholis), 212.
parvipinnis (Atherina), 396.
parvipinnis (Lophius), 180.
pasuruensis (Gobius), 32.
Patæcus, 292.
patella (Gobius), 6.
pauciradiata (Atherina), 401.
pavo (Blennius), 221, 561.
pavoninoides (Gobius), 5.
pavoninus (Adonis), 222.
pavoninus (Chironectes), 183.
pavoninus (Cyclopterus), 155.
pavoninus (Gobius), 70.
pectinifer (Clinus), 262.
pectinifer (Labrosomus), 262.
pectinirostris (Boleophthalmus), 102.
pectinirostris (Gobius), 102.
pectoralis (Atherina), 399.
pectoralis (Dactyloscopus), 563.
pedaraki, 410.
Peddaraki, 410.
Pediculati, 166, 178.
pellucidus (Gobius), 556.
pellucidus (Latrunculus), 556.
pennantii (Blennius), 284.
pentazona (Acanthurus), 329.
Pentophthalmus, 540.
pentophthalmus (Mastacembelus), 540.
percoides (Agonostoma), 464.
percoides (Pseudoblennius), 297.
perelegans (Callionymus), 150.
periophthalmoides (Gobius), 21.
Periophthalmus, 96.
periophthalmus (Eleotriodes), 124.
periophthalmus (Eleotris), 124.
periophthalmus (Salarias), 251.
peronii (Mugil), 452.
personatus (Gobius), 64.
perspicillatus (Clinus), 271.
perusii (Mugil), 422.
peruvianus (Clinus), 261.
Pesce Rey, 402.
petherici (Mugil), 441.
petimba, 529.
petrophilus (Gobius), 75.
Petroscirtes, 229.
petrosus (Mugil), 431.
pflaumii (Gobius), 45.
phaëton (Callionymus), 147.
phaiomelas (Gobius), 42.
phaiosoma (Gobius), 21.
phaiosoma (Salarias), 245.
phaiospilosoma (Gobius), 31.
phalæna (Gobius), 67.
Pharopteryx, 363.
Philypnoides, 469.
Philypnus, 105, 119.
phlebotomus (Acanthurus), 330.
Pholidichthys, 293.
Pholis, 211, 226.
pholis (Adonis), 226.
pholis (Blennius), 226, 229
phymatodes (Antennarius), 198.
pictus (Chaunax), 200.
pictus (Chironectes), 186, 187.
pictus (Lophius), 195.
piger (Gouania), 515.
piger (Lepadogaster), 515.
piger (Leptopterygius), 515.
Pike-fish, 533.
pinguis (Atherina), 399.
pinniceps (Antennarius), 190.
pinnulatus (Cyclopterus), 509.
pinnulatus (Lepadogaster), 509.
pinnulatus (Trachelochismus), 509.
piscatorius (Batrachus), 179.
piscatorius (Lophius), 178, 180, 181.
pisonis (Eleotris), 122.
pisonis (Gobius), 122.
planiceps (Mugil), 428.
planiceps (Ophiocephalus), 474.

planifrons (Batrachus), 171.
platycephalus (Gobius), 5, 21, 553.
platynotus (Gobius), 66.
Platyptera, 138.
platyrostris (Gobius), 553.
Plesiopina, 363.
Plesiops, 363.
pleurophthalmus (Ophiocephalus), 479.
pleurostigma (Gobius),43.
pleurotænia (Gunellichthys), 280.
plicatile (Agonostoma), 461.
plicatilis (Cestræus), 461.
plinianus (Boleophthalmus), 102.
plinianus (Gobius), 102.
plumieri (Coryphæna), 359.
plumieri (Gobius), 92.
plumieri (Malacanthus), 359.
plumieri (Mugil), 409.
plumieri (Sicydium), 92.
plumieri (Sphyræna), 409.
Pocamo, 166.
pœcilophthalmus (Cotylis), 503.
pœcilophthalmus (Gobiesox), 503.
pœcilophthalmus (Tomicodon), 503.
pœcilosoma (Gobius), 4.
poeyi(Dactyloscopus),563
polaris (Blennius), 295.
polaris (Zoarces), 295.
politus (Chironectes), 183.
polyacantha (Rhynchobdella), 542.
Polyacanthus, 378.
polyacanthus (Monocirrhus), 371.
polyactocephalus (Blennius), 285.
polyactocephalus (Gunellus), 285.
Polycentridæ, 370.
Polycentrus, 370.
polycynodon (Gobius), 30.
polylepis(Ophiocephalus), 475.
polynema (Chæturichthys), 46.
polynema (Gobius), 46.
polyodon (Blennechis), 235.
polyodon (Petroscirtes), 235.
polyophthalmus (Antennarius), 198.
polyophthalmus(Gobius), 73.
polyophthalmus (Trichonotus), 484.
Polypterichthys, 535.
pontica (Atherina), 393.
ponticeriana (Colisa),387.
ponticerianus (Mastacembelus), 543.
Porichthys, 175.
porocephaloides, 109.
porocephalus (Eleotris), 107, 108.
porosissimus (Batrachus), 176.
porosissimus(Porichthys), 176.
porosus (Batrachus), 177.
porosus (Porichthys), 177.
potamophila (Eleotris), 557.
præcisus (Chirus), 283.
presbyter (Atherina), 391, 393.
presbyteroides (Atherina), 397.
priamensis (Salarias), 244.
principis (Antennarius), 193.
principis (Chironectes), 189, 193.
Priodon, 348.
Prionurus, 347.
prismatica (Eleotris), 105.
proboscideus (Mugil),459.
provensalis (Mugil), 453, 454.
Pseudoblennius, 297.
Pseudochromides, 362.
Pseudoclinus, 297.
pseudomarulius (Ophiocephalus), 478.
Psychrolutes, 516.
Psychrolutidæ, 516.
puella (Teuthis), 323.
puellus (Amphacanthus), 323.
pugnax (Betta), 389.
pugnax (Macropodus), 389.
pulchellus (Cyclogaster), 164.
pulchellus (Liparis), 164, 559.
pulcher (Diplopterus), 390.
pulcher (Luciocephalus), 390.
Punaru, 242.
punctata (Amphisile),527.
punctata (Atherina), 392.
punctatus (Amphacanthus), 320, 321.
punctatus (Batrachus), 171.
punctatus (Blennechis), 230.
punctatus (Blennius), 217, 228, 233.
punctatus (Callionymus), 145.
punctatus (Chironectes), 182.
punctatus (Clinus), 283.
punctatus (Gunellus), 283.
punctatus (Hoplognathus) 358.
punctatus (Lepadogaster), 514.
punctatus (Mastacembelus), 541.
punctatus (Ophiocephalus), 469.
punctatus (Petroscirtes), 230.
punctatus (Scaradon),358.
punctatus (Stichæus), 283.
punctillatus (Gobius), 25.
punctulata (Amphisile), 527.
punctulatus (Batrachus), 171.
punctulatus (Blennius), 215, 268.
punctulatus (Callionymus), 150.
punctulatus (Naseus),347.
puniceus (Diplocrepis), 506.
puniceus (Lepad.), 506.
puntang (Gobius), 19.
puntangoides (Gobius),19.
pusillus (Callionymus), 144.
puticola (Ophiocephalus), 478.
pyroferus (Acanthurus), 337.

quadricapillus, 4, 547.
quadricornis (Salarias), 255.
quadridactylus(Blennius), 298.
quadrifasciatus (Chasmodes), 229.
quadrifasciatus (Pholis), 229.
quadrimaculatus(Gobius), 58.

quadripinnis (Salarias), 244.
quadriporus (Gobius), 4.
quadrispinis (Batrachus), 170.
quagga (Gobius), 16.
Queriman, 423.
quinque-ocellatus (Gobius), 69.
quinque-strigatus (Gobiodon), 87.
quinque-strigatus (Gobius), 87.
quoyi (Belobranchus),127

raaltenii (Salarias), 239.
radiata (Eleotris), 105.
rafinesqui (Lepadogaster), 510.
ramada, 439.
rammelsbergii (Mugil), 420.
Rana marina, 179.
Rana piscatrix, 179.
raninus (Antennarius), 187.
raninus (Lophius), 187.
rasi (Acanthurus), 330.
ratan (Gobius), 547, 551.
reevesii (Callionymus), 145, 148.
Regalecus, 307.
regia (Atherina), 402.
reichii (Gobius), 30.
remipes (Gymnetrus),311.
remipes (Regalecus), 311.
reticulatus (Callionymus), 138.
reticulatus (Chironectes), 199.
reticulatus (Gobius), 4, 16, 554.
reticulatus (Lepadogaster), 505, 514.
Rhinogobius, 4.
rhinorhynchus (Petroscirtes), 230.
rhodopterus (Gobius), 16.
rhodotænia (Ophiocephalus), 472.
rhombeus (Acanthurus), 342.
rhomboidalis (Turdus), 336.
Rhynchobdella, 539.
Rhynchobdelloidei, 539.
Ribbon-fish, 309.
richardsonii (Callionymus), 145.
richardsonii (Gobius), 4.
richardsonii (Mugil), 440.
rictuosus (Apocryptes),82.
ripilepis (Gobius), 5.
rissoanus (Notacanthus), 545.
rissoi (Atherina), 392.
rissoi (Callionymus), 145.
rivulatus (Gobiodon), 87.
rivulatus (Gobius), 87.
rivulatus (Salarias), 244.
rivulatus (Scarus), 322.
robustus (Mugil), 432.
Rognkjække, 155.
roseus (Amblyopus), 133.
roseus (Blennius), 290.
roseus (Centronotus), 290.
roseus (Cristiceps), 274.
roseus (Gunellus), 290.
rossii (Mugil), 436.
rostratum (Ophidium), 540.
rostratus (Amphacanthus), 313.
rostratus (Heterostichus), 261.
rostratus (Lepadogaster), 510.
rostratus (Lophius), 200.
rostratus (Petroscirtes), 230.
rouxi (Blennius), 217.
ruber (Blennius), 211.
ruber (Gobioides), 137.
ruberrimus (Gunellus), 285.
rubescens (Cepola), 486.
rubicundus (Gobioides), 135.
rubriceps (Blennius), 215.
rubro-punctatus (Acanthurus), 333.
rubro-punctatus (Salarias), 249.
rubro-tæniatus (Gobius),6
ruficaudus (Salarias), 240.
rugosus (Amblyopus),133.
rüppellii (Acanthurus), 345.
rüppellii (Mugil), 458.
rüppellii (Trachypterus), 304.
russellii (Amphacanthus), 313, 315.
russellii (Gobius), 21.
russellii (Gymnetrus), 311.
russellii (Regalecus), 311.
russus (Gobius), 72.
ruthensparri (Gobius), 76.

Sabounie, 453.
Saccarius, 183.
sadanundio (Gobius), 29.
sagitta (Callionymus), 146, 147.
sagittula (Euctenogobius), 555.
Salarias, 239.
saliens (Blennius), 242.
saliens (Mugil), 443.
Sand Smelt, 392.
sanguineus (Sicyases), 494
sanguinolentus (Blennius), 218, 561.
sarda (Atherina), 392.
satiricus (Neoclinus), 260.
satyrus (Osphronemus), 382.
satyrus (Trichopus), 382.
Sauclet, 393.
scaber (Chironectes), 188, 190.
scalprum (Acanthurus), 347.
scalprum (Naseus), 347.
scalprum (Prionurus), 347.
scandens (Anabas), 375.
scandens (Lutjanus), 375.
scandens (Perca), 375.
scansor (Amphiprion), 375.
Scaradon, 357.
scaroides (Amphacanthus), 322.
schaapii (Callionymus), 148.
scheli (Mugil), 410.
schlegelii (Cepola), 488.
schlegelii (Gobius), 46.
schlosseri (Gobius), 100.
schlosseri (Periophthalmus), 100.
schomburgkii (Polycentrus), 370.
schultzei (Salarias), 240.
Sciænoidei, 359.
Sciorina, 454.
Scolopax, 518.
scolopax (Centriscus),518.
scolopax (Solenostomus), 519.
Scomberoidei, 539.
scopas (Acanthurus), 342.
Scorpioides, 222.
scutata (Amphisile), 525, 528.
scutatus (Centriscus), 525.
Sea-Bat, 200.
Sea-Devil, 179.
Sea-Snail, 159.
Sea-Toad, 170.
sebæ (Salarias), 246.

semicinctus (Gobius), 68.
semidoliatus (Gobius), 31.
semifasciatus (Blennius), 214.
semilunaris (Gobius), 10, 546.
seminudus (Gobius), 554.
semipunctatus (Asterropteryx), 132.
septem-radiatus (Periophthalmus), 100.
septentrionalis (Mugil), 455.
serpentiformis (Cepola), 487.
serpentinus (Ophiocephalus), 482.
serperaster (Apocryptes), 82.
serrata (Fistularia), 533.
serrato-spinosus (Callionymus), 146.
setigerus (Lophius), 180.
setigerus (Trichonotus), 484.
setosus (Gobius), 44.
sexfilum (Salarias), 241.
sexguttata (Eleotriodes), 130.
sexguttata (Eleotris), 130.
sexguttata (Valenciennea), 130.
sexspinis (Notacanthus), 545, 566.
siamensis (Eleotris), 129.
siamensis (Ophiocephalus), 476.
siamensis (Osphromenus), 385.
Sicyases, 494.
Sicydium, 91.
Sicyogaster, 96, 499.
Sicyopterus, 91.
sigana (Teuthis), 322.
Siganus, 313.
siganus (Amphacanthus), 322.
siganus (Scarus), 322.
signatus (Gobius), 45.
signatus (Polyacanthus), 379, 566.
Sild-kung, 310, 311.
sima (Eleotris), 113.
simak (Ophidium), 541.
Simak-el-inglese, 541.
similis (Rhinogobius), 5.
simplicicornis (Callionymus), 149.
sinensis (Blennius), 219.
sinensis (Bostrychus),127.
sinensis (Eleotris), 127.
sinensis (Gobius), 127.
sinensis (Philypnus), 128.
Skulpin, 139.
smaragdus (Eleotris), 123.
smaragdus (Gobius), 5.
smithii (Mugil), 447.
smyrnensis (Blennius), 216.
smyrnensis (Gobioides), 159.
smyrnensis (Pholis), 216.
sohal (Acanthurus), 334.
sohal (Chætodon), 334.
sohar (Aspisurus), 334.
Solenostomus, 519, 529, 535.
solorensis (Petroscirtes), 235.
somnolenta (Eleotris),557
soporator (Gobius), 26, 549.
sordidus (Blennius), 220.
sordidus (Gobius), 53.
sota, 387.
sowara (Ophiocephalus), 468.
Spada marina, 308.
spadiceus (Blennius), 268.
spatula (Crepidogaster), 508.
spatula (Cyclopterus), 510.
speciosus (Acharnes), 369.
spectabilis (Gobius), 45.
spectrum (Lophius), 188.
speigleri (Mugil), 435.
sphinx (Blennius), 221.
sphinx (Gobius), 67.
spilurus (Gobius), 14.
spinolæ (Trachypterus), 300.
spinosus (Anabas), 375.
spinosus (Cyclopterus), 157.
Spirobranchus, 373.
stamineus (Gobius), 5.
stannii (Cotylis), 499.
Steenbider, 208.
stellata (Halieutæa), 203, 560.
stellata (Teuthis), 320.
stellatus (Amphacanthus), 320.
stellatus (Blennius), 212.
stellatus (Chætodon), 329.
stellatus (Lophius), 203.
stellatus (Scarus), 320.
stelleri (Cyclopterus), 499.
stethophthalmus (Gobius), 70.
stevenii (Gobius), 52, 552.
stevensii (Ophiocephalus), 482.
Stichæus, 280.
stigmatias (Chæturichthys), 78.
stigmatias (Gobius), 78.
stigmothonus (Gobius), 76
stimpsoni (Sicydium), 93.
stipes (Atherina), 400.
storeri (Atherina), 406.
striata (Cepola), 486.
striatus (Acanthurus),334.
striatus (Gobius), 102.
striatus (Lophius), 188.
striatus (Ophiocephalus), 474.
striatus (Osphromenus), 386.
striatus (Salarias), 249.
striatus (Trichopus), 386.
strigata (Amphisile), 528, 566.
strigata (Eleotriodes), 131.
strigata (Eleotris), 131.
strigata (Valenc.), 131.
strigosus(Acanthurus),342
strigosus (Anarrhichas), 208.
striolata (Teuthis), 319.
stroemii (Gunellus), 284.
strongylocephalus (Mugil), 425.
stuvitzii (Gobiosoma), 86.
stuvitzii (Gobius), 86.
Stylephorus, 306.
subarmatus (Acanthurus), 327.
subbifurcatus (Pholis), 280.
subfrenatus(Centronotus), 287.
sublitus (Gobius), 24.
subviridis (Mugil), 423.
Suck-fish, 510.
sueurii (Callionymus), 145.
suillus (Acanthurus), 345.
sujefianus (Blennius),220.
sulcatus (Gobius), 10.
sumatranus (Gobius), 31.
sumatranus (Salarias),252
sumnulentus, 557.
sumpit, 524.
sundanensis (Mugil), 425.
superciliosus (Blennius), 268.
superciliosus (Clinus),268
suppositus (Mugil), 437.
surakartensis, 469.
surinamensis (Batrachus), 174.

sutor (Amphacanthus), 317.
sutor (Teuthis), 317.
Synchiropus, 138.
syriacus (Mastacembelus), 541.
syrman, 547, 551.

tabaccaria (Fistularia), 529, 533.
tade (Mugil), 410.
Tænia, 300.
tænia (Amblyopus), 135.
tænia (Blennius), 285.
tænia (Cepola), 487.
tænia (Gunellus), 285.
tænia (Trachypterus), 302.
tæniata (Atherina), 392.
tæniatus (Aspidontus), 231
tæniatus (Malacanthus), 361.
tæniatus (Petroscirtes), 230.
tæniatus (Trachinops), 366.
Tænioidei, 300, 312, 486.
tænionotopterus (Eleotris), 118.
tænioptera (Eleotris), 127.
tæniopterus (Belobranchus), 127.
Taiasica, 6.
tajasica (Gobius), 59.
tambakkan (Helostoma), 377.
tambujon (Gobius), 32.
tang (Mugil), 417.
Tang-brosme, 281, 285.
tapeinosoma (Naseus), 355
tapeinosoma (Petroscirtes), 230.
tapeinosoma (Priodon), 355.
tasmanianus (Blennius), 214.
tasmaniensis (Crepidogaster), 507.
tau (Batrachoides), 174.
tau (Batrachus), 167, 170.
tau (Gadus), 167, 170.
telfairii (Agonostoma), 462.
telum (Gymnetrus), 309.
telum (Regalecus), 309.
temminckii (Atherina), 392.
temminckii (Dictyosoma), 279, 564.
temminckii (Gobius), 47.
temminckii (Helostoma), 377, 566.
temminckii (Petroscirtes), 236.
tenebrosus (Antennarius), 197.
tenebrosus (Chironectes), 197.
tennentii (Acanthurus), 337.
tentacularis (Blennius), 212, 215, 560.
tentacularis (Gobius), 48.
tentacularis (Oxyurichthys), 48.
testar (Gobiesox), 499.
testar (Lepadogaster), 499.
testudinarius (Clinus), 272.
testudineus (Amphiprion), 375.
testudineus (Anabas), 375.
testudineus (Anthias), 375.
testudineus (Sparus), 375.
testudo (Lutjanus), 375.
tetradactylus (Salarias), 242.
Tetragonurina, 407.
Tetragonurus, 407.
tetrazona (Amphacanthus), 323.
tetrazona (Teuthis), 323.
Teuthididæ, 313.
Teuthis, 313.
Teuthyes, 313, 325.
textilis (Salarias), 248.
Thalassophryne, 174.
theophrasti (Ophiocephalus), 469.
thepassii (Petroscirtes), 238.
theuthis (Acanthurus), 341.
thynnoides (Axinurus), 355.
thynnoides (Naseus), 355.
tigris (Antennarius), 189.
tigris (Chironectes), 189.
tolsoni (Eleotris), 110.
Tomicodon, 494, 499.
tonganus (Naseus), 353.
trabeatus (Eleotris), 105.
Trachelochismus, 509.
Trachinops, 366.
trachinus (Malacanthus), 359.
trachyptera (Cepola), 302.
Trachypteridæ, 300.
Trachypterus, 300.
tractus (Acanthurus), 325.
transandeanus (Gobius), 62.
trautvetteri (Gobius), 553.
tredecim-radiatus (Gobius), 100.
tredecim-radiatus (Periophthalmus), 100.
Triænophorichthys, 89.
Triænophorus, 89.
triangulus (Acanthurus), 341.
Trichogaster, 387.
Trichonotidæ, 384.
Trichonotus, 484.
trichopterus (Labrus), 384.
trichopterus (Osphromenus), 384.
trichopterus (Trichogaster), 384.
trichopterus (Trichopus), 384.
Trichopus, 382.
tricolor (Polycentrus), 371.
tridactylus (Blenn.), 242.
tridactylus (Salarias), 242.
tridens (Antennarius), 190, 191.
tridens (Chironectes), 191.
Tridentiger, 566.
tridigitatus (Dactyloscopus), 279, 563.
trifasciata (Betta), 388.
trifoliatus (Anabas), 375.
trigloides (Batrachus), 166.
trigloides (Blennius), 227.
trigloides (Callionymus), 166.
trigloides (Pholis), 227.
trigloides (Tripterygium), 279.
trigonocephalus (Triænophorichthys), 89.
triostegus (Acanthurus), 327.
triostegus (Chætodon), 327
tripeltes (Naseus), 349.
tripinnis (Blennius), 278.
tripteronotus (Blennius), 276.
Tripterygium, 276.
trisignatus (Chironectes), 184.
trispinosus (Batrachus), 169.
troschelii (Mugil), 448.
Trumpet-fish, 518.
truncata (Malthea), 201.
truncatus (Blennius), 252.
Trypauchen, 137.
Trypauchenichthys, 137.
Trypauchenina, 137.
tuber (Naseus), 353.
tuberosus (Antennarius), 199.

tuberosus (Chironectes), 199.
tuberosus (Naseus), 353.
tuberosus (Naso), 353.
tubulosa (Teuthis), 324.
tudes (Gobiesox), 499.
tumidus (Chironectes), 186.
tumidus (Lophius), 186.
tumifrons (Amphacanthus), 317.
tumifrons (Eleotris), 111.
tumifrons (Teuthis), 317.
tunicata (Liparis), 161.
tylankahanensis (Gobius), 4.
typus (Oxymetopon), 153.
typus (Trypauchenichthys), 138.

undulatus (Acanthurus), 335.
undulatus (Macrognathus), 543.
unicolor (Colisa), 388.
unicolor (Gobius), 37.
unicolor (Mastacembelus), 542.
unicolor (Naseus), 347.
unicolor (Salarias), 259.
unicolor (Trichogaster), 388.
unicornis (Acanthurus), 348.
unicornis (Antennarius), 199.
unicornis (Aspisurus), 348
unicornis (Chætodon), 348
unicornis (Naseus), 348.
unimaculatus (Clinus), 283
unimaculatus (Stichæus), 283.
unipennis (Chironectes), 182.
unipunctatus (Gobius).58.
upsicephalus (Lophius), 181.
Uranoscopus, 140.
urolepis (Amblyopus), 136
urophthalmoides (Eleotris), 128.
urophthalmus (Antennarius), 192.
urophthalmus (Eleotris), 128.
urophthalmus (Ophiocephalus), 479.

Vaagmär, 305.
vagina (Gobius), 137.
vagina (Trypauchen), 137.
Valenciennea, 105, 130.
valenciennesii (Atherina), 398.
valenciennesii (Callionymus), 145.
valenciennesii (Mugil), 410.
valentini (Polypterichthys), 538.
variabilis (Petroscirtes), 234.
variegata (Batrachoides), 166.
variegatus (Anabas), 374.
variegatus (Batrachus), 166, 167.
variegatus (Callionymus), 148.
variegatus (Chironectes), 197.
variolatus (Salarias), 248.
variolosus (Auchenionchus), 265.
variolosus (Clinus), 265.
variolosus (Salarias), 247.
varium (Tripterygium), 277.
varius (Blennius), 277.
varus (Blennius), 212, 220
velifer (Acanthurus), 344, 345.
velitaris (Centriscus), 524.
venenatus (Gobius), 38.
venosus (Mastacembelus), 543.
ventralis (Gobius), 21.
ventricosus (Cyclopterus), 498.
ventricosus (Lepadogaster), 498.
ventricosus (Mugil), 410.
ventrosus (Blennius), 215.
venustus (Macropodus), 382.
veranyi (Clinus), 276.
vermiculata (Teuthis), 317
vermiculatoides (Salarias), 239.
vermiculatus (Amphacanthus), 317.
vermiculatus (Salarias), 249.
vernullas (Batrachoides), 167.
Verzellata, 443.
vespertilio (Lophius), 200.
vespertilio (Malthe), 200.
violaceus (Cebidichthys), 260.
violaceus (Apodichthys), 260.
virescens (Apodichthys), 290.
virescens (Clinus), 272.
virescens (Gobius), 4.
virgata (Teuthis), 323.
virgatus (Amphacanthus), 323.
virgo (Gobius), 79.
viridescens (Atherina), 406.
viridi-auratus (Macropodus), 381.
viridi-pallidus (Gobius), 85.
viridi-punctatus (Gobius), 24.
viridis (Eleotris), 105.
viridis (Myxodes), 260.
viridis (Salarias), 247.
vittatus (Acanthurus), 333
vittatus (Osphromenus), 386.
viviparus (Blennius), 295
viviparus (Euchelyopus), 295.
viviparus (Gunellus), 295.
viviparus (Lophius), 180.
viviparus (Zoarces), 295.
vlamingii (Naseus), 353.
vogmarus (Trachypterus), 305.
Vogmeri, 305.
voigtii (Gobius), 72.
vomerina (Atherina), 404.
vomerinus (Lophius), 181.
vomerinus (Salarias), 254.
vulgaris (Blennius), 217, 561.
vulgaris (Colisa), 387.
vulgaris (Gunellus), 286.
vulgaris (Liparis), 159.
vulpina (Teuthis), 324.
vulpinus (Amphacanthus), 324.
Vulsus, 151.

waigiensis (Atherina), 392, 400.
waigiensis (Mugil), 435.
webbianus (Lepadogaster), 511.
webbii (Blennophis), 259.
wildenovii (Lepadogaster), 514.
wolffii (Eleotris), 105.
Wolf-fish (Ravenous), 208.
wrahl (Ophiocephalus), 474.
würdemanni (Gobius), 6, 546.

xanthopterus (Acanthurus), 330.
xanthosoma (Clinus), 273.
xanthosoma (Cristiceps), 273.
xanthosoma (Gobiodon), 42.
xanthosoma (Gobius), 42.
xanthotænia (Gobius), 72.
xanthozona (Gobius), 66.
xanthurum (Sicydium), 93.
xanthurus (Acanthurus), 343.
xanthurus (Mugil), 422.
xanti, 263.
Xiphidion, 291.

yarrellii (Blennius), 284.

zebra (Acanthurus), 327.
zebra (Chætodon), 327.
zebrinus (Lepadogaster), 511.
zebrinus (Mastacembelus), 541.
Zoarces, 295.
zosterophorum (Sicydium), 95.

END OF THE THIRD VOLUME.

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CATALOGUE

OF THE

FISHES

IN THE

BRITISH MUSEUM.

BY

DR. ALBERT GÜNTHER.

FIRST ORDER.

ACANTHOPTERYGII.

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SYSTEMATIC SYNOPSIS

OF

THE FAMILIES

OF THE

ACANTHOPTERYGIAN FISHES.

THE following Synopsis has been prepared for the purpose, first, of showing my views on the natural affinities of these fishes, and, secondly, of facilitating their determination. Technical characters, therefore, have been combined with the natural, so far as this appeared to be required for the second purpose. Those species which do not fall within the limits of these characters, forming exceptions to the general plan of structure of their relations, are named in footnotes.

I.

A soft dorsal and an anal fin. Vent remote from the extremity of the tail, behind the ventral fins, if they are present.

First division: *Acanth. perciformes.*

Body more or less compressed, elevated or oblong, not elongate. No prominent anal papilla; no superbranchial organ. Dorsal fin or fins occupying the greater portion of the back; spinous dorsal well developed, generally with stiff spines, of moderate extent, rather longer than, or as long as the soft[1]; the soft anal similar to the soft dorsal, of moderate extent or rather short[2]. Ventrals thoracic, always present, with one spine and with five or four rays well developed.

I. Ventral 1/5, rarely 1/4; no bony stay for the præoperculum*. A lateral line.

  A. Lateral line uninterrupted[3]; neither trenchant teeth nor molars; no barbels at the throat. Lower pectoral rays branched.

    a. Teeth on the palate[4]; vertical fins not scaly.
    3. PERCIDÆ, i. p. 51.

    b. Palate toothless[5]; body oblong, or, if elevated, with the vertical fins scaleless .... 5. PRISTIPOMATIDÆ, i. p. 272.

    c. Vertical fins scaly; body elevated, or, if oblong, with setiform teeth in the jaws or villiform bands on the palate.
    8. SQUAMIPINNES, ii. p. 1.

  B. Lateral line interrupted ..33. NANDIDÆ, iii. p. 362.

  C. A pair of moveable barbels at the throat.
  6. MULLIDÆ, i. p. 397.

  D. Either series of trenchant teeth in the jaws or molars on the sides .... 7. SPARIDÆ, i. p. 412.

  E. Teeth of the jaws confluent into a cutting lamella.
  31. HOPLOGNATHIDÆ, iii. p. 357.

  F. Lower pectoral rays not branched; neither trenchant teeth nor molars in the jaws...... 9. CIRRHITIDÆ, ii. p. 70.

II. A bony stay for the angle of the præoperculum, which is armed, the bone arising from the infraorbital ring.
10*b*. SCORPÆNINA, ii. p. 88.

III. Lateral line none; a long spinous anal fin.
34. POLYCENTRIDÆ, iii. p. 370.

IV. Ventral with an outer and inner spine (1/4/1).
29. TEUTHIDIDÆ, iii. p. 313.

* I propose this name for the bone which in the true *Cataphracti*, Cuv., reaches from the orbit to the *angle* of the præoperculum, and *serves to support the spine* with which the angle is armed.

---

[1] Rhypticus (i. p. 171), Centrarchus sparoides (i. p. 257), Hyperoglyphe (i. p. 337).

[2] Haplodactylus (i. p. 434), some species of Chilodactylus (ii. p. 78); long in Latris (ii. p. 86).

[3] Ambassis interrupta, buruensis (i. p. 226).

[4] Prionodes (i. p. 96).

[5] Some species of Therapon (i. p. 274).

Second division: *Acanth. beryciformes.*

Body compressed, oblong or elevated; head with large muciferous cavities, covered with thin skin only. Ventral fins thoracic, with one spine and more than five soft rays, in *Monocentris* with only two.

One family only . . . . 2. BERYCIDÆ, i. p. 8.

Third division: *Acanth. kurtiformes.*

One dorsal fin only, much shorter than the anal, which is long. No superbranchial organ.

One family only . . . . 25*b*. KURTIDÆ[6], ii. p. 508.

Fourth division: *Acanth. polynemiformes.*

Two rather short dorsal fins, somewhat remote from each other; free filaments at the humeral arch below the pectorals; head with the muciferous system well developed (aspect sciænoid).

One family only . . . . 13. POLYNEMIDÆ, ii. p. 319.

Fifth division: *Acanth. sciæniformes.*

The soft dorsal is more, generally much more, developed than the spinous, or than the anal. No pectoral filaments; head with the muciferous system well developed.

One family only . . . . 12. SCIÆNIDÆ, ii. p. 265.

Sixth division: *Acanth. xiphiiformes.*

The upper jaw is produced into a long cuneiform weapon.

One family only . . . . 18. XIPHIIDÆ, ii. p. 511.

Seventh division: *Acanth. trichiuriformes.*

Body elongate, compressed or band-like; cleft of the mouth wide, with several strong teeth in the jaws or on the palate. The spinous and soft portions of the dorsal fin and the anal are of nearly equal extent, long, many-rayed, sometimes terminating in finlets: caudal fin forked, if present.

One family only . . . . 15. TRICHIURIDÆ, ii. p. 342.

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[6] This family formerly formed a group of the Carangidæ (Kurtina).

Eighth division: *Acanth. cotto-scombriformes*[7].

Spines developed in one of the fins at least. Dorsal fins either continuous or close together: the spinous dorsal, if present, always short, sometimes modified into tentacles or into a suctorial disk; soft dorsal always long, if the spinous is absent[8]; anal similarly developed as the soft dorsal, and both generally much longer than the spinous[9], sometimes terminating in finlets. Ventrals thoracic or jugular, if present, never modified into an adhesive apparatus. No prominent anal papilla.

I. One dorsal fin, with several pungent spines anteriorly; one or more bony spines on each side of the tail; teeth compressed, truncated or lobate, closely set in a single series.
30. ACRONURIDÆ, iii. p. 325.

II. Structure of the skeleton firm; no bony stay for the præoperculum; teeth conical or triangular, if present.

A. The spinous portion of the dorsal present, sometimes rudimentary. Body compressed, oblong or elevated. Vertebræ 10/14[10] ....17. CARANGIDÆ, ii. p. 417.

B. Body elevated, with two distinct divisions of the dorsal fin. Vertebræ $\frac{10+x}{14+y}$..........16*c*. CYTTINA, ii. p. 354.

C. Dorsal fin without a distinct spinous portion; head and body compressed. Vertebræ $\frac{10+x}{14+y}$.

a. Toothed processes extend into the œsophagus.
16*d*. STROMATEINA, ii. p. 355.

b. No teeth in the œsophagus.
16*e*. CORYPHÆNINA, ii. p. 355.

D. Two dorsal fins; sometimes finlets; caudal forked. Scales cycloid, of moderate size. Vertebræ $\frac{10+x}{14+y}$.[11]
16*b*. NOMEINA, ii. p. 354.

E. Two dorsal fins: either finlets, or the spinous dorsal composed of free spines or modified into a suctorial disk, or the ventrals jugular and composed of four rays. Scales none, or very small ....16*a*. SCOMBRINA, ii. p. 354.

F. Body more or less elongate. A spinous dorsal or portion of the dorsal generally distinct, its spines being connected by a membrane; finlets none; caudal not forked; ventrals composed of one spine and five soft rays. Pyloric appendages none, or in small or moderate number.

---

[7] The true Cottoids gradually pass into the Scombroids proper.

[8] Aspidophoroides (ii. p. 216).

[9] Some species of Agonus (ii. p. 211).

[10] Sometimes one or two more or less than twenty-four.

[11] Platystethus appears to belong rather to the Carangidæ (ii. p. 391).

a. Vertebræ $\frac{10 \text{ or } 10+x}{14+y}$ ......11. Trachinidæ, ii. p. 225.

b. Vertebræ 10/14 ......32. Malacanthidæ, iii. p. 359.

G. The spinous dorsal present, composed of a few pungent spines; ventrals jugular, 1/2 ....22. Batrachidæ, iii. p. 166.

H. The spinous dorsal advanced on the head, and more or less modified into tentacles ..23. Pediculati, iii. p. 178.

III. A bony stay for the angle of the præoperculum, which is armed, the bone arising from the infraorbital ring.

A. Body naked or covered with ordinary scales, or incompletely cuirassed with single series of plate-like scales.
10 *c.* Cottina, ii. p. 89.

B. Body completely cuirassed by bony keeled plates or scales.
10 *d.* Cataphracti, ii. p. 90.

IV. Skeleton soft ....26. Comephoridæ, iii. p. 299.

Ninth division: *Acanth. gobiiformes.*

The spinous dorsal, or spinous portion of the dorsal, is always present[12], short, either composed of flexible spines or much less developed than the soft; the soft dorsal and anal of equal extent. Ventrals thoracic or jugular, if present, composed of one spine and five, rarely four, soft rays. A prominent anal papilla[13].

I. Anal spines 0–2; ventral fins.

A. Ventrals entirely modified into a perfect disk adherent to the belly ....20. Discoboli, iii. p. 154.

B. Ventrals with the rays always distinct, sometimes united into one fin ....19. Gobiidæ, iii. p. 1.

II. Anal spines six; ventral fins none.
21. Oxudercidæ, iii. p. 165.

Tenth division: *Acanth. blenniiformes.*

Body low, subcylindrical or compressed, elongate, rarely oblong as in *Patæcus*. Dorsal fin very long: the spinous portion of the dorsal, if distinct, is very long, as well developed as the soft, or much more[14];

---

[12] Luciogobius (iii. p. 152).

[13] Asterropteryx (iii. p. 132).

[14] Zoarces (iii. p. 295).

sometimes the whole composed of spines only; anal more or less long; caudal subtruncated or rounded, if present; ventrals thoracic or jugular, if present.

I. Body band-like; no bony stay for the præoperculum; ventrals thoracic, 1/5 . . . . 41. CEPOLIDÆ, iii. p. 486.

II. Ventrals jugular, 1/5 . . . . . . 40. TRICHONOTIDÆ, iii. p. 484.

III. A bony stay for the angle of the præoperculum, the bone arising from the infraorbital ring . . 10 *a*. HETEROLEPIDINA, ii. p. 88.

IV. Ventrals jugular[15], composed of a few rays, if present; a prominent anal papilla; anal spines none, or in very small number . . . . 24. BLENNIIDÆ, iii. p. 206.

V. Anal spines numerous . . . . . . 25. ACANTHOCLINIDÆ, iii. p. 297.

VI. Ventrals none; no prominent anal papilla; body eel-like; numerous free dorsal spines . . 46. MASTACEMBELIDÆ, iii. p. 339.

Eleventh division: *Acanth. mugiliformes.*

Two dorsal fins more or less remote from each other; the anterior either short, like the posterior, or composed of feeble spines; ventral fins well developed, 1/5, abdominal.

I. Dentition strong; vertebræ 24.
14. SPHYRÆNIDÆ, ii. p. 334.

II. Vertebræ $\frac{10+x}{14+y}$; dentition feeble or of moderate strength.
37. ATHERINIDÆ, iii. p. 391.

III. Dentition feeble; vertebræ 24.
38. MUGILIDÆ, iii. p. 409.

Twelfth division: *Acanth. gasterosteiformes.*

The spinous dorsal is composed of isolated spines, if present; the ventrals have an abdominal position in consequence of the prolongation of the pubic bones, which are attached to the humeral arch.

I. Ventral joined to the pubic bone, with a spine and with a few rudimentary rays . . . . 1. GASTEROSTEIDÆ, i. p. 1.

II. Ventral remote from the pubic bone, with six soft rays.
45. FISTULARIDÆ, iii. p. 529.

[15] Pseudoblennius (iii. p. 297); ? Andamia (iii. p. 294).

Thirteenth division: *Acanth. centrisciformes.*

Two dorsal fins, the spinous short, the soft and the anal of moderate extent. Ventral fins truly abdominal, imperfectly developed.

One family only..............44. CENTRISCIDÆ, iii. p. 518.

Fourteenth division: *Acanth. gobiesociformes.*

No spinous dorsal; the soft and the anal short, or of moderate length, situated on the tail; ventral fins subjugular, $\frac{1}{5(4)}$, with an adhesive apparatus between them or entirely absent. Body naked.

I. An adhesive apparatus between the ventrals.
42. GOBIESOCIDÆ, iii. p. 489.

II. Ventrals none ....43. PSYCHROLUTIDÆ, iii. p. 516.

Fifteenth division: *Acanth. channiformes.*

Body elongate, covered with scales of moderate size; no spine in any of the fins; dorsal and anal long. No superbranchial organ, only a bony prominence on the interior surface of the epitympanic bone.

One family only..............39. OPHIOCEPHALIDÆ, iii. p. 468.

Sixteenth division: *Acanth. labyrinthibranchii.*

Body compressed, oblong or elevated, with scales of moderate size. A superbranchial organ in a cavity accessory to that of the gills, for the purpose of retaining water.

I. Dorsal or anal spines present, sometimes in great number.
35. LABYRINTHICI, iii. p. 372.

II. Neither dorsal nor anal spines.
36. LUCIOCEPHALIDÆ, iii. p. 390.

II.

Dorsal and anal fins developed. Vent in front of the ventrals.

Only one family.............. 4. APHREDODERIDÆ, ii. p. 271.

III.

Body riband-shaped, with the vent near its extremity; a short anal behind the vent; dorsal as long as the body.

Only one family..............28. LOPHOTIDÆ, iii. p. 312.

IV.

Anal absent; caudal rudimentary, or not in the longitudinal axis of the fish. Skeleton soft.

Only one family, with feeble dentition.
27. Trachypteridæ, iii. p. 300.

V.

A soft dorsal is absent or quite rudimentary; ventrals abdominal, composed of several unarticulated and articulated rays.

Only one family . . . . 47. Notacanthi, iii. p. 544.

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